Anritsu

ME3401A

Digital Transmission Analyzer

Service Manual

ME3401A

Digital Transmission Analyzer

Service Manual

Ninth Edition

Read this manual after reading the operation manual first. Keep it handy so that it can be read when necessary.

Measuring Instruments Division
Measurement Group

ANRITSU CORPORATION

SEP.
1996

Document No.: M-W0519BE-9.0

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Insure that you clearly understand the meanings of the symbols BEFORE using the equipment.

Symbols used in manual

DANGER	This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.
WARNING	This indicates a hazardous procedure that could result in serious injury or death if not performed properly.
CAUTION	This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

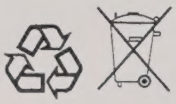
(Some or all of the following five symbols may not be used on all Anritsu equipment. In addition, there may be other labels attached to products which are not shown in the diagrams in this manual.) The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Insure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.

This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

This indicates warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in the box.



These indicate that the marked part should be recycled.

ME3401A Digital Transmission Analyzer
Service Manual

July 1989 (First Edition)
May 1996 (Ninth Edition)

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Printed in japan

For Safety

or

Repair

WARNING ⚠

WARNING

1. Always refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.
   Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangers.
2. When supplying power to this equipment, connect the accessory 3-pin power cord to a 3-pin grounded power outlet. If a grounded 3-pin outlet is not available, before supplying power to the equipment, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.
3. This equipment cannot be repaired by the user. DO NOT attempt to open the cabinet or to disassemble internal parts. Only Anritsu-trained service personnel or staff from your sales representative with a knowledge of electrical fire and shock hazards should service this equipment.

Changing Fuse

CAUTION ⚠

CAUTION

1. Before changing the fuses, ALWAYS remove the power cord from the poweroutlet and replace the blown fuses. Always use new fuses of the type and rating specified on the fuse marking on the rear panel of the cabinet.

   T□□□ A indicates a time-lag fuse.
   □□□A or F□□□ A indicate a normal fusing type fuse.

   There is risk of receiving a fatal electric shock if the fuses are replaced with the power cord connected.

(Blank)

Equipment Certificate

Anritsu Corporation certifies that this equipment was tested before shipment using calibrated measuring instruments with direct traceability to public testing organizations recognized by national research laboratories including the Electrotechnical Laboratory, the National Research Laboratory and the Communication Research laboratory, and was found to meet the published specifications.

Anritsu Warranty

Anritsu Corporation will repair this equipment free-of-charge if a malfunction occurs within 1 year after shipment due to a manufacturing fault, provided that this warranty is rendered void under any or all of the following conditions.

- The fault is outside the scope of the warranty conditions described in the operation manual.
- The fault is due to misoperation, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault is due to natural disaster including fire, flooding and earthquake, etc.
- The fault is due to use of non-specified peripheral equipment, peripheral parts, consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation will not accept liability for equipment faults due to unforeseen and unusual circumstances, nor for faults due to mishandling by the customer.

Anritsu Corporation Contact

If this equipment develops a fault, contact Anritsu Corporation or its representatives at the address in this manual.

Note:

Ac line power supply voltage rating change

The ME3401A is provided with a power transformer with several taps so that a nominal ac line voltage specified from 100 to 240 Vac can be used.

When changing the nominal ac line voltage rating, change the wiring of the appropriate primary taps of the power transformer in accordance with Fig. 1.

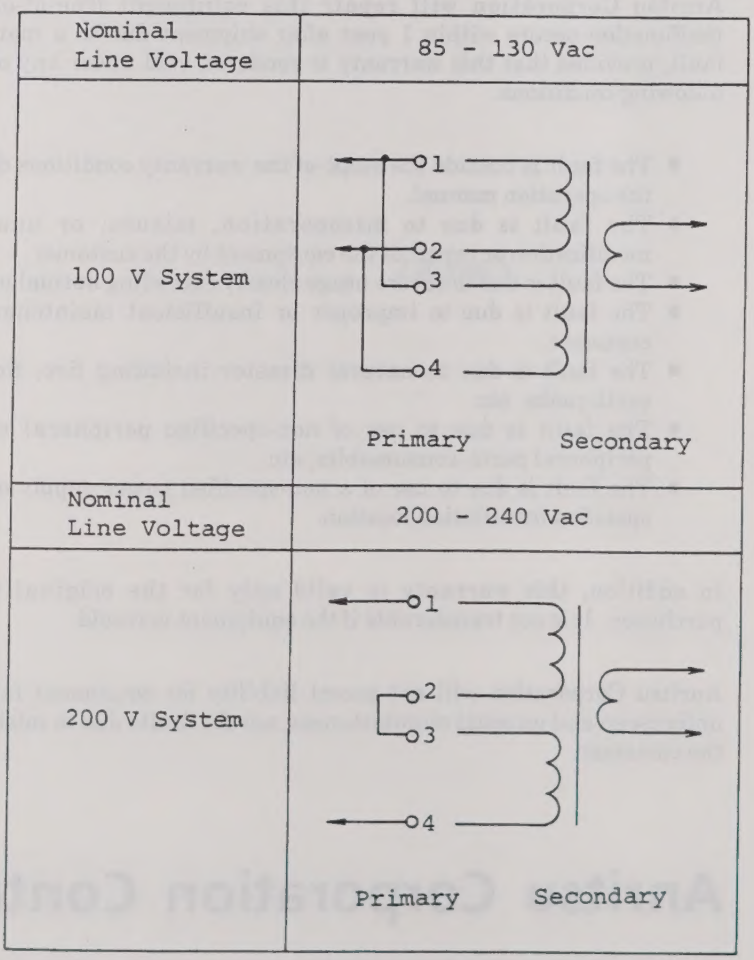

Fig. 1 Power Transformer Tap Connection

Part Names & Part Numbers

Please specify the part numbers shown in the parts list when making inquiries or when ordering parts. There may be a difference between the names of parts used in this manual and the parts actually used in the equipment or supplied for repair. This is because equivalent parts with the same functions, performance and reliability as the parts specified in the circuit diagrams and parts list have been used or supplied. Since the parts are equivalent, they have absolutely no adverse effect on the equipment specified functions, performance or reliability.

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SECTION 1

GENERAL

This is the service manual for the ME3401A DIGITAL TRANSMISSION ANALYZER. It contains the following sections.

SECTION 2 MECHANICAL CONFIGURATION

This section describes how the various PC board are laid out.

SECTION 3 TROUBLESHOOTING AND ADJUSTMENT

This section describes how to troubleshoot the equipment. Circuit diagrams for the ME3401A are given in this section.

SECTION 4 REPLACEABLE PARTS

This section explains how to order replacement parts from the parts list.

For the specifications, operating instructions, performance check, and a detailed description of the ME3401A panel controls, refer to the separate operation manual.

SECTION 2

MECHANICAL CONFIGURATION

2.1 Introduction

This section explains how to disassemble the ME3401A.

2.2 Disassembly

2.2.1 Cabinet disassembly

Table 2-1 Mechanical Parts List

No.	Parts No.	Description	Remarks	Qty.
Fig. 2-1 (1)	422B13763B 43B35817 43B35818A,B	Cover	For receiver	1 set
(2)	422B13763A 43B35817 43B35818A,B	Cover	For transmitter	1 set
(3)	33E28694B	Cord winder		4
(4)	349B73661	Side handle		1
(5)	34E84192	Side foot		4
(6)	322B7672	Standard foot		4
(7)	349B73667	Stacking foot	Opt - 61	4
(8)	43H35813A 43H35813B	Foot pad	Opt - 61	1 1
(9)	3NPS12B3+SW+WB	Screw		4

Table 2-1 Mechanical Parts List (Cont'd)

No.		Parts No.	Description	Remarks	Qty.
Fig. 2-1	⑩	5FPS30S7	Screw		1
	⑪	5FPS16S7	Screw		1
	⑫	4NPS16B3+SW+WB	Screw		8
	⑬	3NPS10B3+SW+WB	Screw		4
	⑭	5BPS25S3+WB	Screw		1
	⑮	5BPS12S3+WB	Screw		1
	⑯	4NPS10S7+SW	Screw	Opt - 61	4

1. Remove the eight screws (9), (10), (11), (14) and (15) in Fig. 2-1 and lift off the cover (1). (For Receiver)

2. Remove the eight screws (9), (10), (11), (14) and (15) or twelve screws (9), (10), (11), (14), (15) and (16) (for OPT 61) and lift off the cover (2).

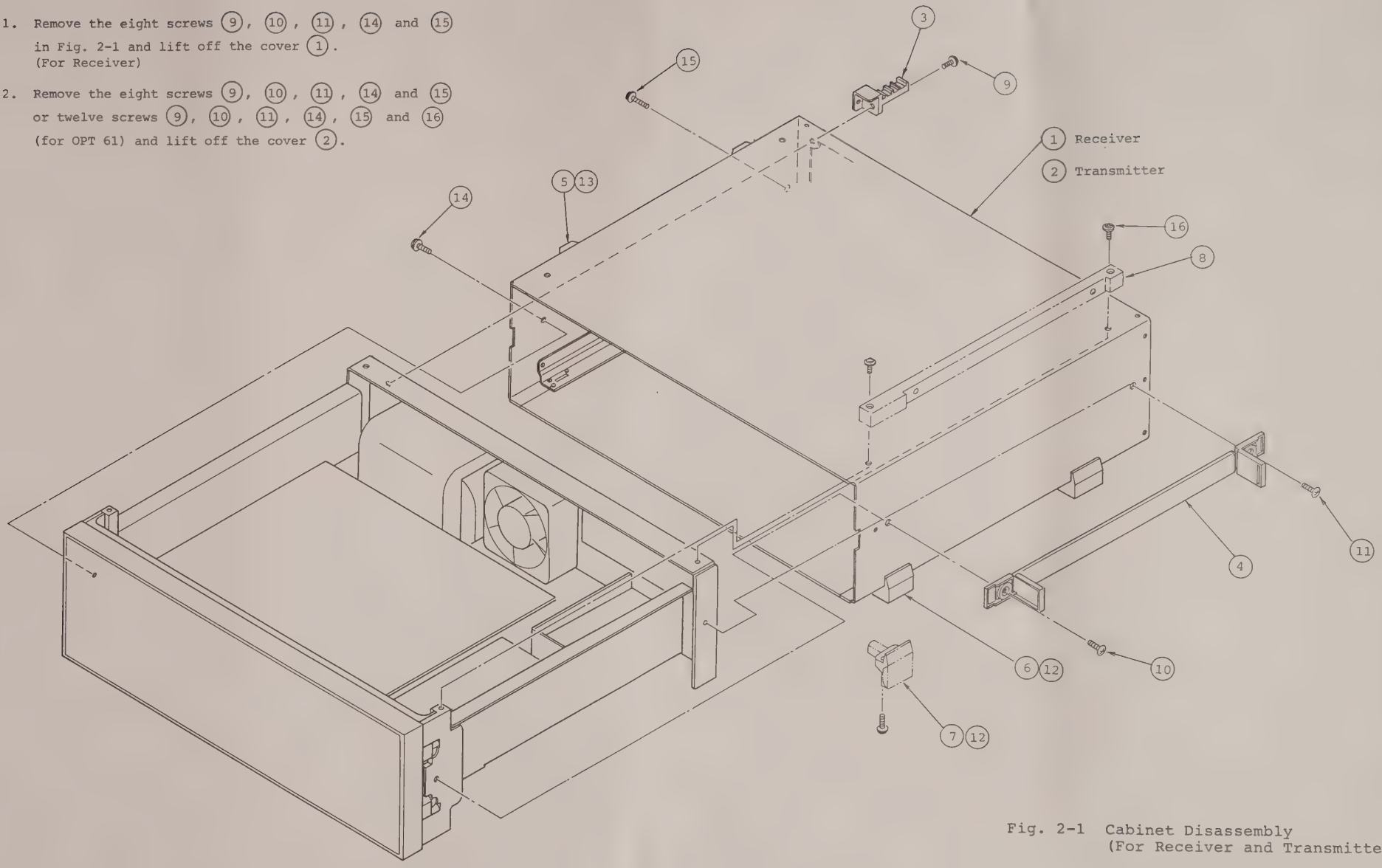


Fig. 2-1 Cabinet Disassembly
(For Receiver and Transmitter)

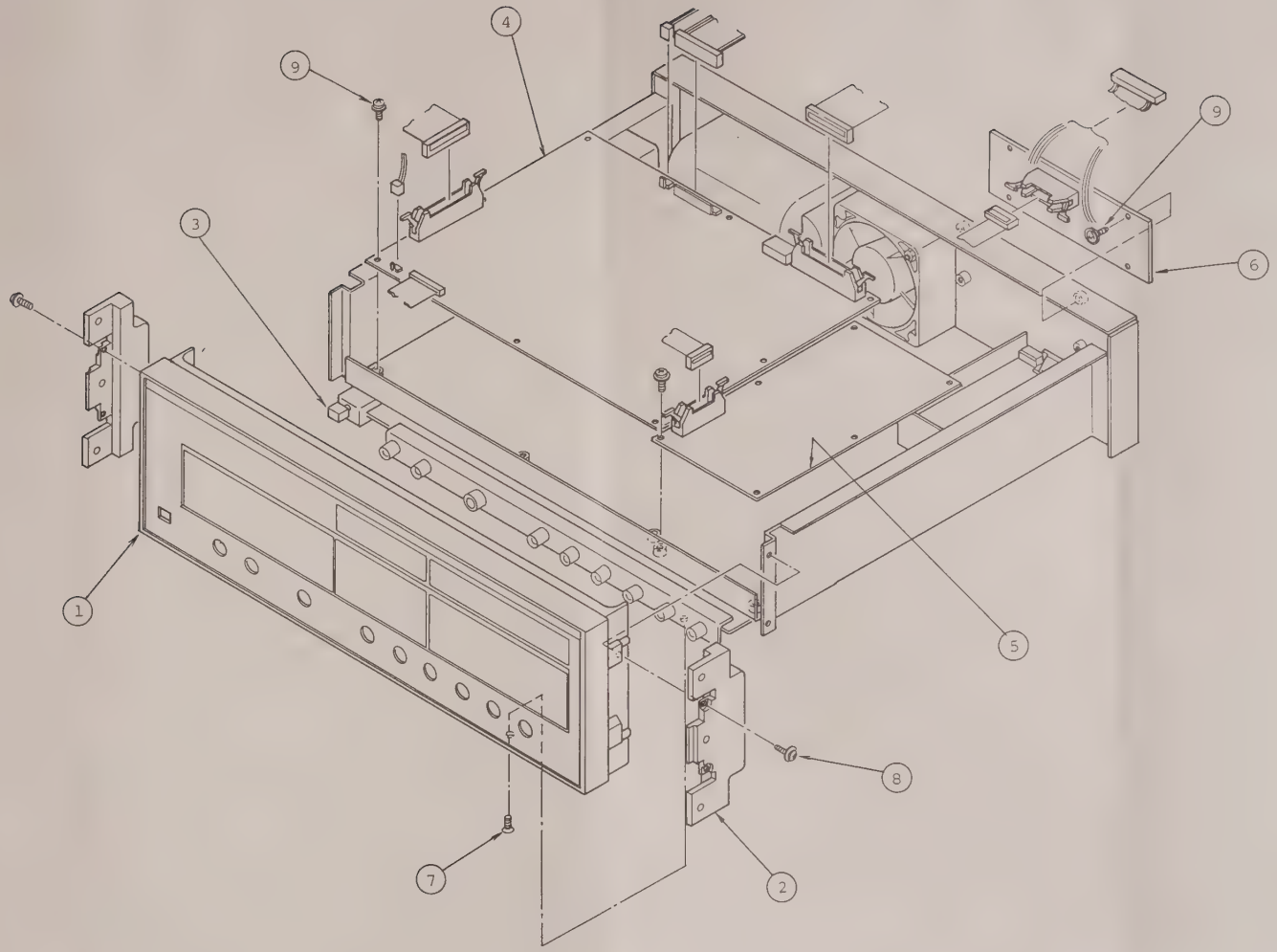


Fig. 2-2 Transmitter Exploded View (Front Panel)

Table 2-3 Mechanical Parts List

No.		Parts No.	Description	Remarks	Qty.
Fig. 2-3	(1)		Rear panel		1
	(2)	422U13911	A4 PC board		1
	(3)	422U13832	A1 PC board		1
	(4)	44Y88128	GP-IB interface	OPT - 41	1
	(5)	34B64690C	Protective mesh cover		1
	(6)				
	(7)	3BPS8S3+WB	Screw		4
	(8)	3NPS8B3+SW+WB	Screw		4
	(9)	3FPS6B3	Screw		4
	(10)	3NPS6B3+SW	Screw		16
	(11)	3FPS10B3	Screw		4

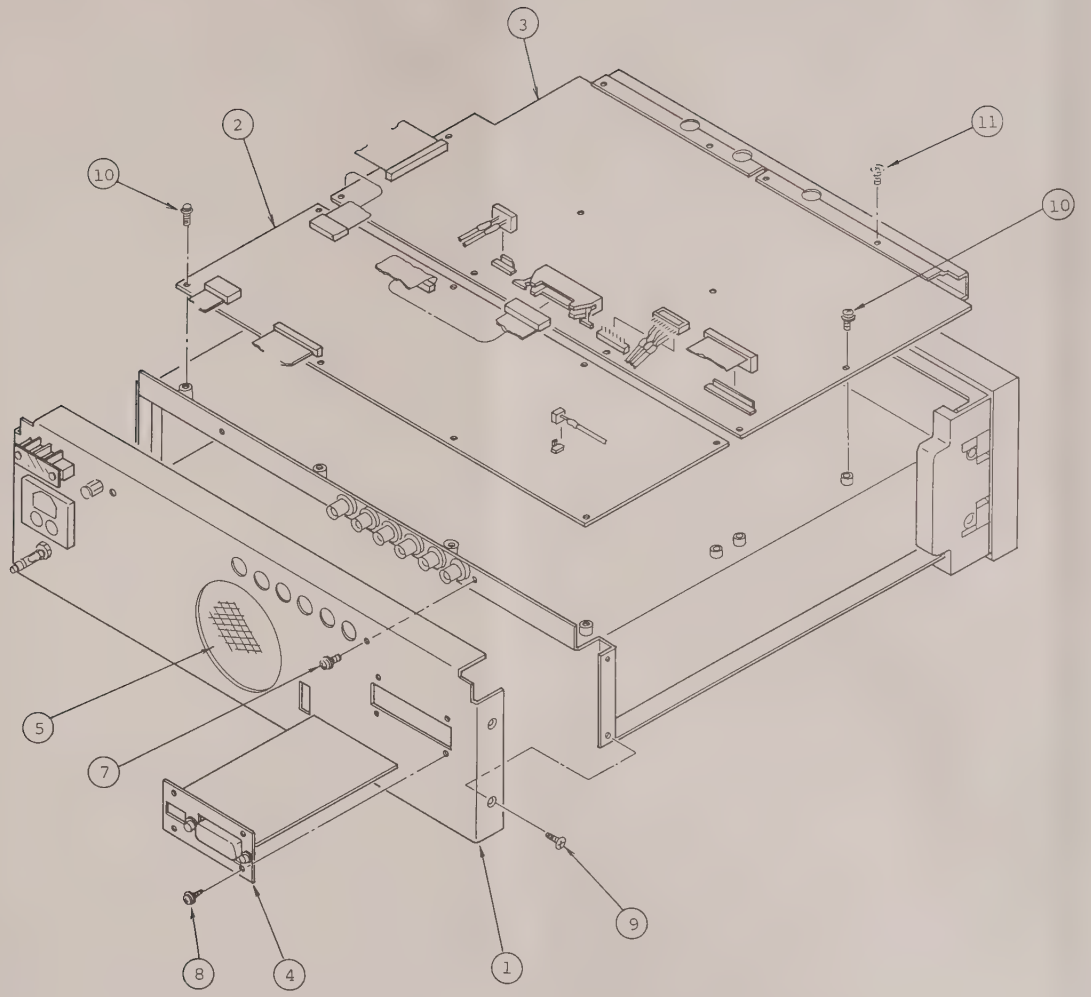


Fig. 2-3 Transmitter Exploded View (Rear Panel)

2.2.3 Receiver exploded view

Table 2-4 Mechanical Parts List

No.	Parts No.	Description	Remarks	Qty.
Fig. 2-4 (1)	44Y91104B	Front panel		1 set
(2)	43H37160	Bracket		2
(3)	44E68583	Button		1
(4)	422U14527	A2 PC board		1
(5)	442U88382	A4 PC board		1
(6)	3FPS10B3	Screw		2
(7)	3NPS12B3+SW+WB	Screw		4
(8)	3NPS6B3+SW	Screw		14

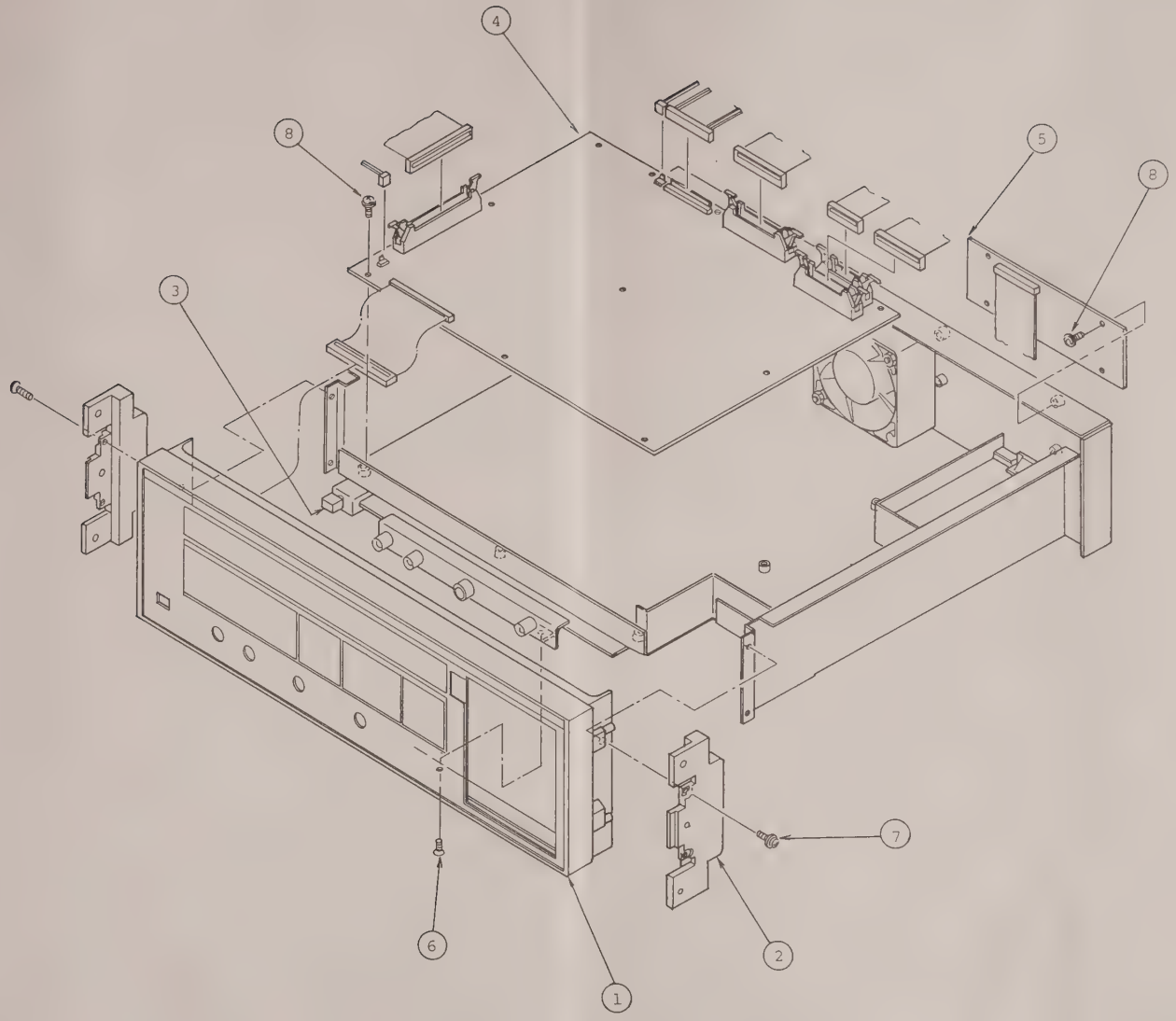


Fig. 2-4 Receiver Exploded View (Front Panel)

Table 2-5 Mechanical Parts List

No.	Parts No.	Description	Remarks	Qty.
Fig. 2-5 (1)	422B13759	Rear panel		1
(2)	422U13913	A5 PC board		1
(3)	422U13838	A1 PC board		1
(4)	44Y88128	GP-IB interface	OPT - 42	1
(5)	34B64690C	Protective mesh cover		1
(6)				
(7)	3BPS8S3+WB	Screw		4
(8)	3NPS8B3+SW+WB	Screw		4
(9)	3FPS6B3	Screw		4
(10)	3NPS6B3+SW	Screw		14
(11)	3FPS10B3	Screw		2
(12)				

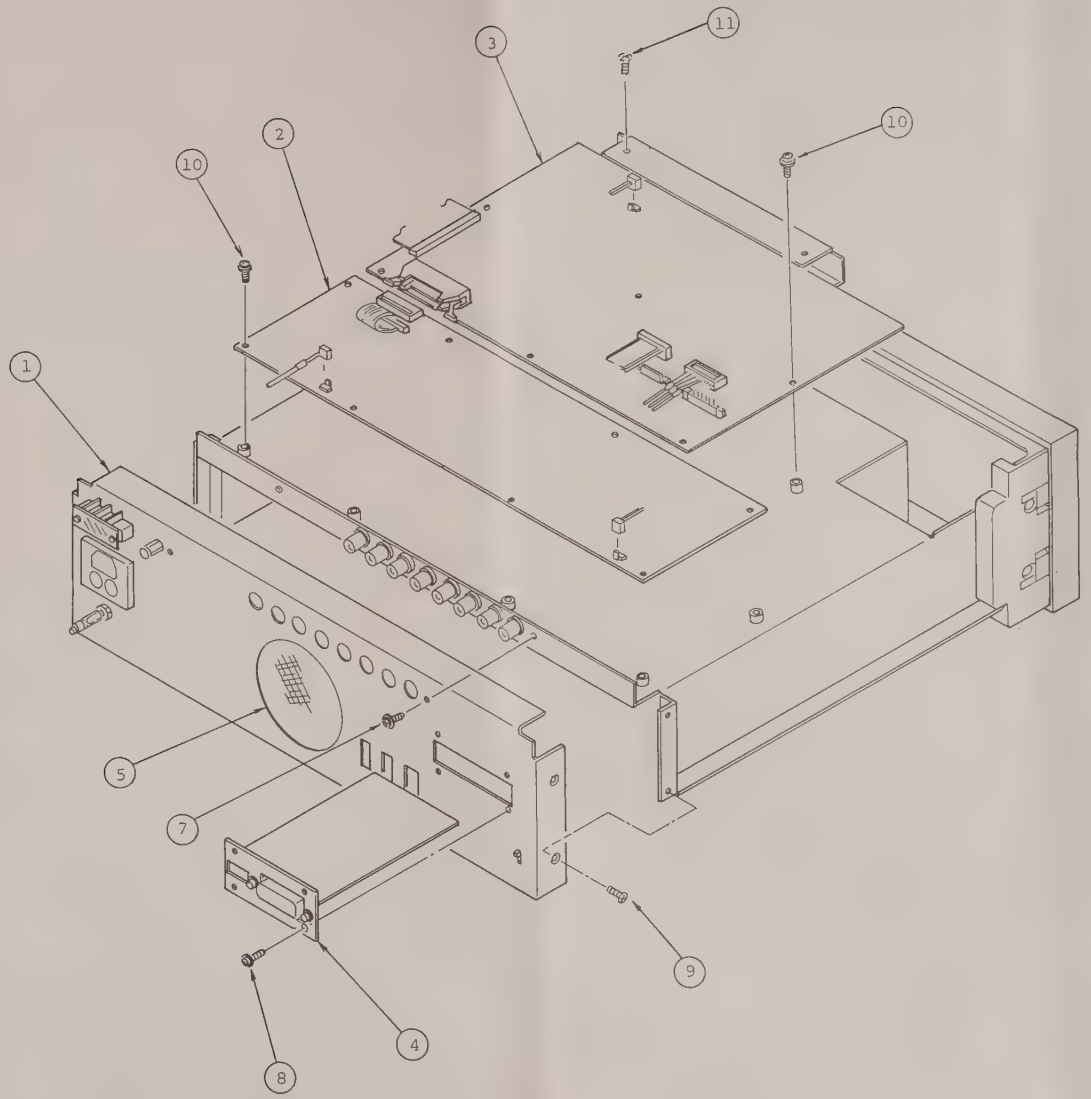


Fig. 2-5 Receiver Exploded View (Rear Panel)

2.2.4 Printer option 11 exploded view

Table 2-6 Mechanical Parts List

No.	Parts No.	Description	Remarks	Qty.
Fig. 2-6 (1)	43B38103	Blank panel		1
(2)	44Y88122	Printer	OPT 11	1
(3)	44B90923	Washer		
(4)	44B90923	Stopper		
(5)	44H90472	Guide		
(6)	3FPS10B3	Screw		4
(7)	4NPS20B3+SW+WB	Screw		2

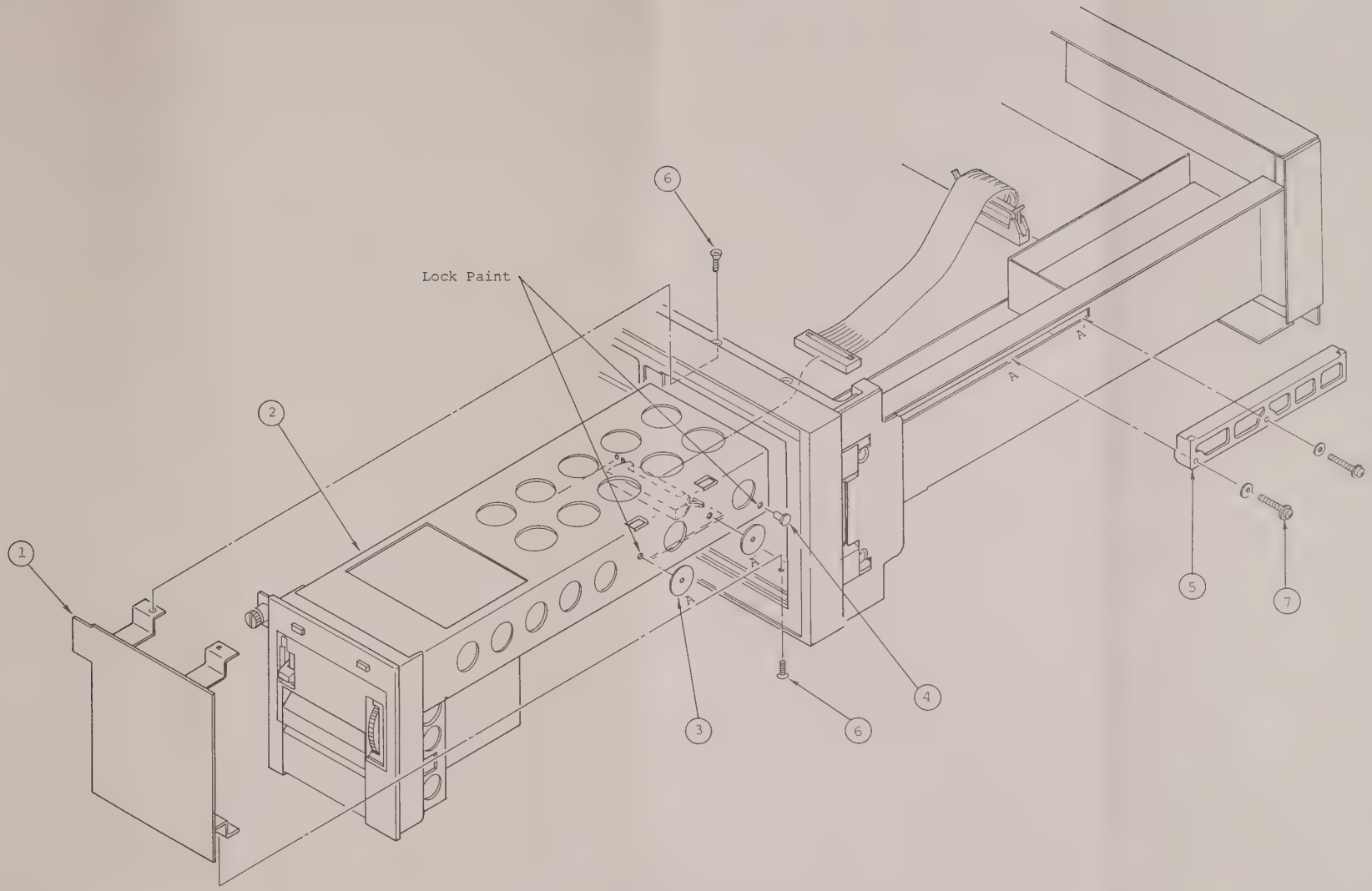


Fig. 2-6 Printer Option 11
Exploded View
(Blank Panel and Printer)

SECTION 3

TROUBLESHOOTING AND ADJUSTMENTS

3.1 Introduction

This section describes how to troubleshoot and adjust the instrument when trouble occurs during measurement or when abnormalities are detected during performance check operations.

This section also explains checking and replacement of parts, principles of operation providing details on circuits, and the equipment necessary to make repairs and adjustments.

Troubleshooting is diagrammed as follows.

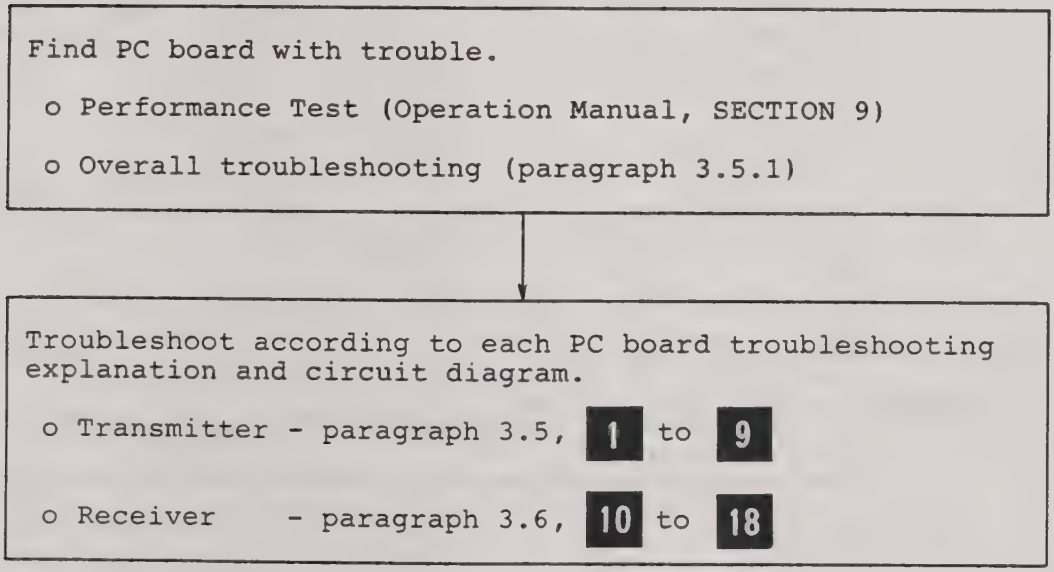

Find PC board with trouble.
o Performance Test (Operation Manual, SECTION 9)
o Overall troubleshooting (paragraph 3.5.1)
Troubleshoot according to each PC board troubleshooting explanation and circuit diagram.
o Transmitter - paragraph 3.5, 1 to 9
o Receiver - paragraph 3.6, 10 to 18

Fig. 3-1 Troubleshooting Procedure

Refer to each PC board circuit diagram and the parts layout for the positions of the test points to be checked when troubleshooting each PC board.

3.2 Checking and Replacing Parts, and Changing AC Power Supply Rating

3.2.1 Explanation of PC board identification markings

As shown in Fig. 3-2, each PC board in the ME3401A has a unified ASSEMBLY number, DRAWING number and REVISION number.

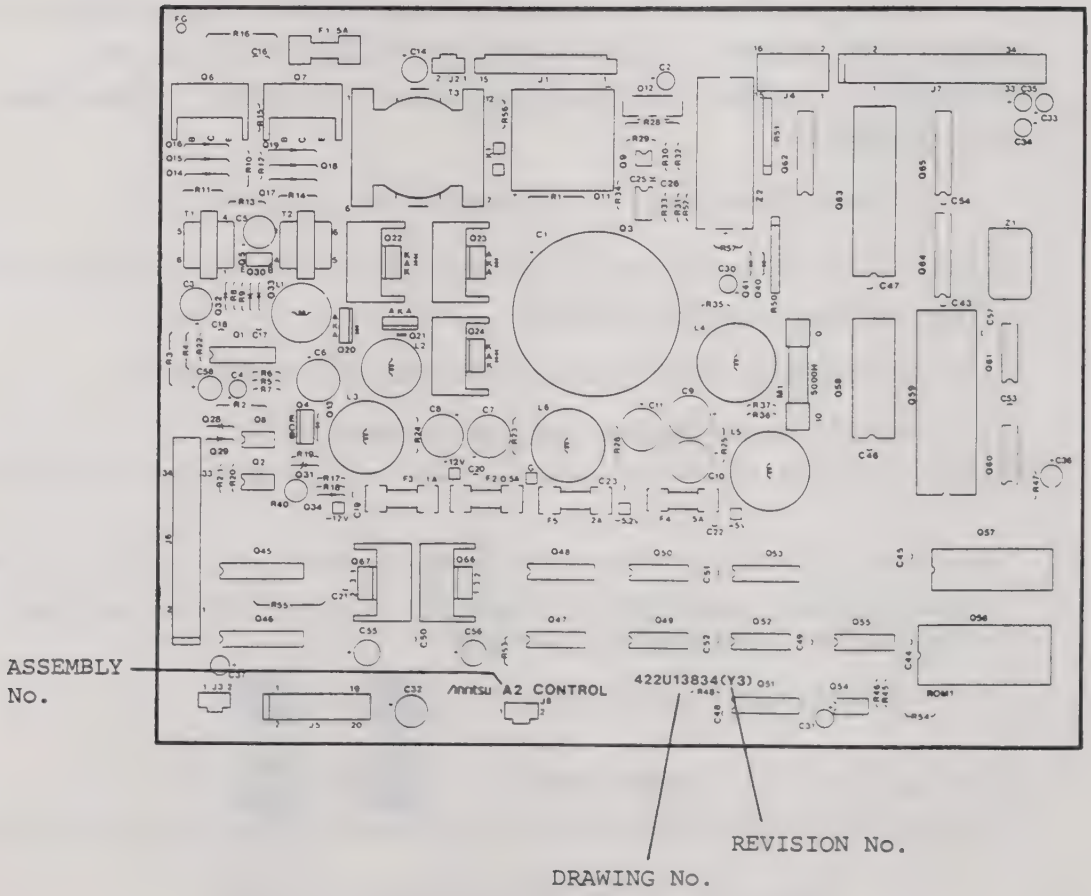


Fig. 3-2 Board Markings

3.2.2 Notes on soldering

(1) Use an ordinary 30- to 40-watt pencil-type soldering iron.

(2) Before using the soldering iron, be sure it is well insulated because leakage current may damage the part.

(3) When removing a soldered part from a circuit board or soldering in a new part, hold the part lead with tweezers to shunt heat.

(4) The tips of major part leads are bent behind the PC board to ensure tight support. To remove a part, first lift up the tips of the leads and then remove the part.

3.2.3 Transistor check

(1) Transistors mounted on PC board

Transistors can be checked for acceptable quality in the operating state by measuring the base and emitter potentials. NPN silicon transistors have a base potential that is 0.6 or 0.7 V higher than the emitter potential. In PNP silicon transistors, the former is 0.6 or 0.7 V lower than the latter. Transistors are faulty if these relationships are not satisfied.

(2) Transistors removed from PC board

Removed transistors can be checked by measuring the resistance between the emitter, base, and collector using a circuit tester. The standard values are given in Table 3-1. This check must be performed at a measuring current of less than 100 μA.

Table 3-1 Resistance Test of Unmounted Transistors

Type of Transistor	Connect Ohmmeter		Resistance
	Positive lead to	Negative lead to	
PNP silicon	Emitter, Collector	Base	1 Ω to 10 kΩ
	Emitter	Collector	Very high
NPN silicon	Base	Emitter, Collector	1 Ω to 10 kΩ
	Emitter	Collector	Very high

3.3 Equipment Required for Troubleshooting and Adjustment

The equipment listed in Table 3-2 and Table 3-3 is recommended for adjustment and troubleshooting. Different test equipment may be used if it meets the required characteristics listed in the table.

Table 3-2 Equipment Required for Troubleshooting and Adjusting ME3401A Transmitter

No.	Name	Major specification
1	Oscilloscope	Frequency band: DC to 300 MHz
2	Frequency counter	Frequency band: 0.01 Hz to 50 MHz
3	DC voltmeter	Meas. range: 0 to 100 V Resolution : 0.01 V
4	Signal generator	Frequency range: 1 to 50 MHz Resolution : 1 kHz
5	Terminator with 20 dB attenuation	Input/Output voltage ratio: 10:1
6	Pulse generator	Frequency range: 1 Hz to 10 MHz Level : TTL
7	Pulse Pattern Generator	Frequency band : 1 to 50 MHz Level : TTL, ECL Impedance : 75 Ω

Table 3-3 Equipment Required for Troubleshooting and Adjusting ME3401A Receiver

No.	Name	Major specification
1	Oscilloscope	Frequency range: DC to 300 MHz
2	Frequency counter	Frequency band: 10 Hz to 50 MHz
3	DC voltmeter	Meas. range: 0 to 100 V Resolution : 0.01 V
4	ME3401A Transmitter	

3.4 Circuit Reference

The PC boards in the ME3401A Transmitter and ME3401A Receiver have A numbers such as A3.

Tables 3-4 and 3-5 list the A numbers, circuit diagram names, PC board DRAWING numbers, and parts list numbers. CIRCUIT DIAGRAM Nos. are the numbers of the circuit diagrams shown in this section.

The parts list is given in SECTION 4.

Table 3-4 ME3401A Transmitter Circuit Reference

Circuit diagram No.	Name	A No.	PC board drawing No.	Parts list No.
1	ME3401A TRANSMITTER	———	———	44W88384
2	T-CONTROL	A2	422U13834	44W88386
3	PATTERN GENERATOR	A1	422U13832	44W88385
4	T-DISPLAY	A3	422U13836	44W88387
5	JITTER MODULATION	A4 (OPT 01)	422U13913	44W88388
6	MODULATION SIGNAL GENERATOR	A5 (OPT 01)	432U36046	44W88408
7	T-SWITCH	A6	442U91223	44W90993
8	GP-IB	A7 (OPT 41)	442U83054	44W83046
9	RS-232C	A8 (OPT 43)	442U83056	44W83047

Table 3-5 ME3401A Receiver Circuit Reference

Circuit diagram No.	Name	A No.	PC board drawing No.	Parts list No.
10	ME3401A RECEIVER	———	———	44W88389
11	R-CONTROL	A2	422U14527	44W91570
12	ERROR DET	A1	422U13838	44W88390
13	R-DISPLAY	A3	422U13842	44W88392
14	JITTER MEASUREMENT	A5 (OPT 02)	422U13911	44W88395
15	R-SWITCH	A4	442U88382	44W88394
16	PRINTER UNIT	A8	———	44W85802
17	PRINTER INTERFACE	Z1 in A8	432U34770	44W85804
18	PRINTER CONTROL	Z2 in A8	442U77432	44W85805
8	GP-IB	A6 (OPT 42)	442U83054	44W83046
9	RS-232C	A7 (OPT 43)	442U83056	44W83047
19	DS-1 OUTPUT	A9 (OPT 03)	442U95076	44W95156

3.5 Transmitter Troubleshooting and Adjustment

3.5.1 Overall troubleshooting 1

(1) Overall circuit description

Figure 3-3 is the transmitter simplified block diagram. The ME3401A transmitter consists of A1 PATTERN GENERATOR, A2 T-CONTROL, A3 T-DISPLAY, A4 JITTER MODULATION, A5 MODULATION SIGNAL GENERATOR, A6 T-SWITCH, A7 GP-IB, and A8 RS-232C.

For the details of each circuit, refer to paragraph 3.5.2 to 3.5.7.

(2) Overall troubleshooting

If a problem is indicated by the performance check (operation manual, SECTION 9), locate the fault by using the following procedures.

[Step 1]

When power switch turned on, POWER-ON lamp comes on?

No

AC operation

- AC power cord not connected to AC power supply
- Rear-panel AC fuse blown
- AC power circuit (A2 and S1) faulty
- LED (Q10-A3) faulty

DC operation

- Abnormal DC supply voltage
  (Specification: -22 to -53 V)
- Connection abnormal between DC power supply and DC input connector
- POWER circuit (A2 and S1) is defective.
- LED (Q10-A3) is defective.

[Step 2]

When each switch on front panel operated, each display (including LEDs) comes on normally?

No

A2 T-CONTROL faulty (paragraph 3.5.2)

A3 T-DISPLAY faulty (paragraph 3.5.4)

[Step 3]

If the internal clock, external clock, pattern, frame, error addition, DS-3 output, DS-1/DS-1C/DS-2 output, unipolar output, and X-bit input are abnormal, the A1 PATTERN GENERATOR is abnormal (paragraph 3.5.3).

[Step 4]

If the JITTER MODULATION is abnormal, either A4 JITTER MODULATION (paragraph 3.5.5) or A5 MODULATION SIGNAL GENERATOR (paragraph 3.5.6) is abnormal, or both are abnormal.

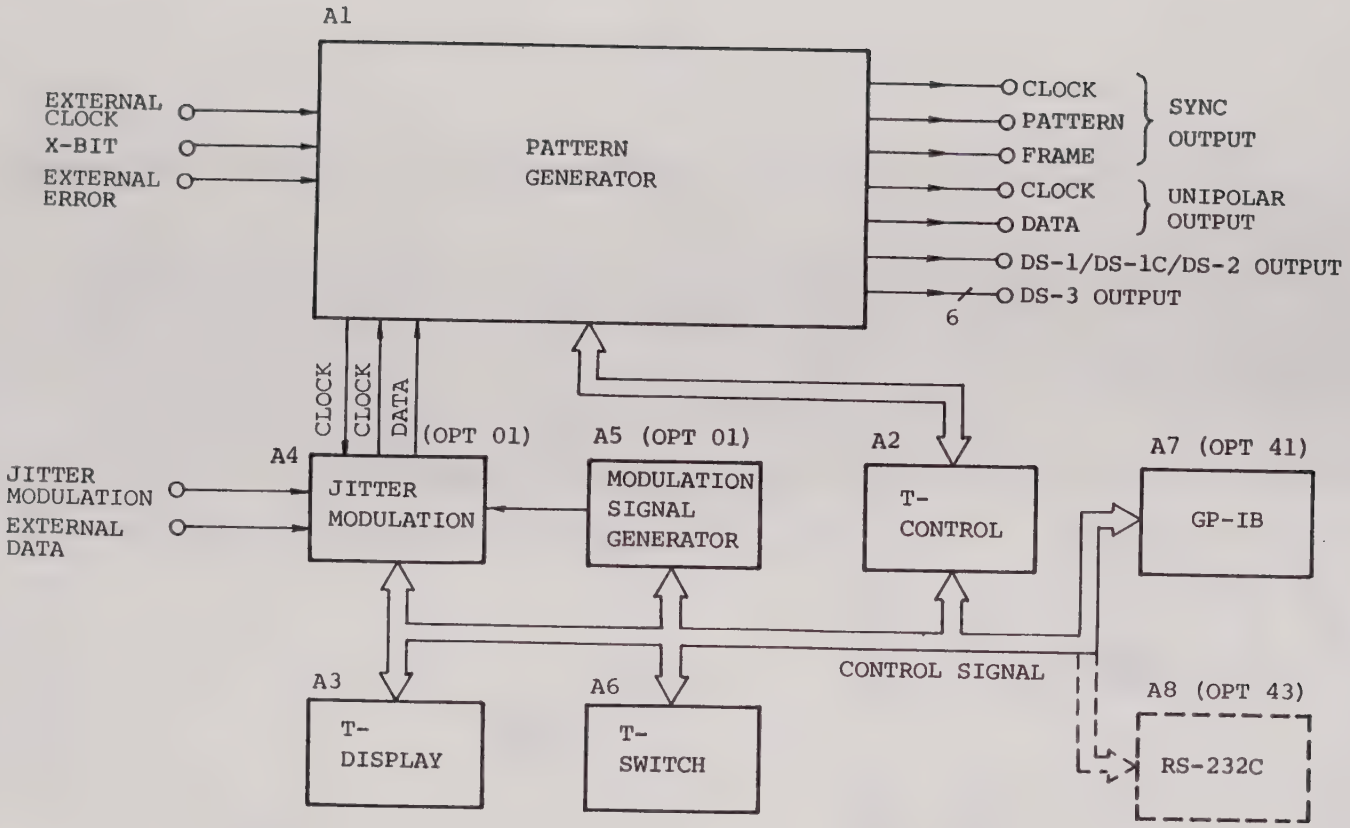
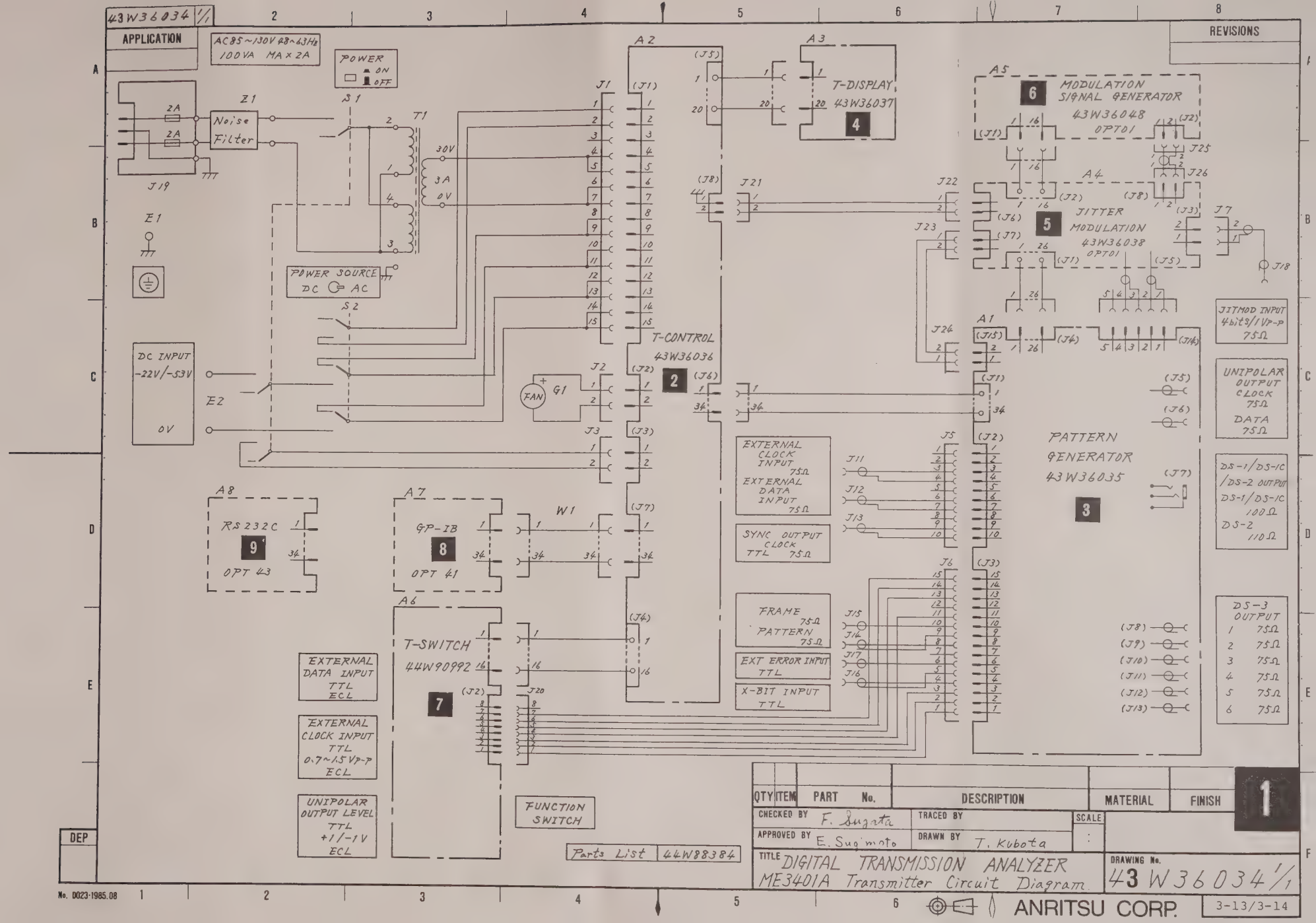


Fig. 3-3 ME3401A Transmitter Simplified Block Diagram


43W36034 1/1
APPLICATION
AC85~130V 48~63Hz
100VA MAX 2A
POWER
ON
OFF
Z1
Noise Filter
2A
2A
J19
S1
T1
30V
3A
0V
E1
POWER SOURCE
DC AC
S2
DC INPUT
-22V/-53V
0V
E2
FAN
G1
A2
T-CONTROL
43W36036
2
A3
T-DISPLAY
43W36037
4
A5
6
MODULATION
SIGNAL GENERATOR
43W36048
OPT01
A4
5
JITTER
MODULATION
43W36038
OPT01
A1
PATTERN
GENERATOR
43W36035
3
REVISIONS
JITMOD INPUT
4bit3/1Vp-p
75Ω
UNIPOLAR
OUTPUT
CLOCK
75Ω
DATA
75Ω
DS-1/DS-1C
/DS-2 OUTPUT
DS-1/DS-1C
100Ω
DS-2
110Ω
DS-3
OUTPUT
1 75Ω
2 75Ω
3 75Ω
4 75Ω
5 75Ω
6 75Ω
EXTERNAL
CLOCK
INPUT
75Ω
EXTERNAL
DATA
INPUT
75Ω
SYNC OUTPUT
CLOCK
TTL 75Ω
FRAME
75Ω
PATTERN
75Ω
EXT ERROR INPUT
TTL
X-BIT INPUT
TTL
A8
RS232C
9
OPT 43
A7
GP-IB
8
OPT 41
W1
A6
T-SWITCH
44W90992
7
EXTERNAL
DATA INPUT
TTL
ECL
EXTERNAL
CLOCK INPUT
TTL
0.7~1.5Vp-p
ECL
UNIPOLAR
OUTPUT LEVEL
TTL
+1/-1V
ECL
FUNCTION
SWITCH
Parts List 44W88384
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
1
CHECKED BY F. Sugata
APPROVED BY E. Sugimoto
TRACED BY
DRAWN BY T. Kubota
SCALE
TITLE DIGITAL TRANSMISSION ANALYZER
ME3401A Transmitter Circuit Diagram
DRAWING No. 43W36034 1/1
No. 0023-1985.08
ANRITSU CORP.
3-13/3-14

3.5.2 A2 T-CONTROL PC board 2

(1) Circuit description

A2 T-CONTROL consists of the front switches, display, circuits, GP-IB and RS-232C control circuits, and +5, +12, -5.2, and -12 V power circuits.

(2) Troubleshooting

[Step 1]

Check waveform between ❶ and ground using an oscilloscope.

The waveform shown in Fig. 3-4 is normal. Also, check the frequency at ❶ using a frequency counter.

A frequency of 4.000 MHz is normal.

If both the waveform and frequency are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Z1, Q61, and Q60.

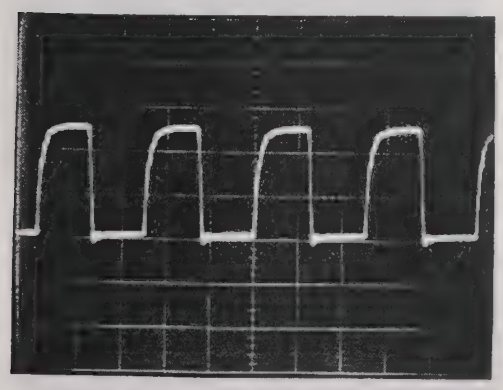


Fig. 3-4 Waveform at ❶

[Step 2]

Check the voltage between ❷ , ❸ and ground using an oscilloscope. If it is within the range of +3 to +5.5 V, it is normal. If it is normal, proceed to the next step. If it is abnormal, troubleshoot the circuits related to ❷ and ❸ .

[Step 3]

Check the waveform between ❹ and ground using an oscilloscope. The waveform shown in Fig. 3-5 is normal. If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❹ .

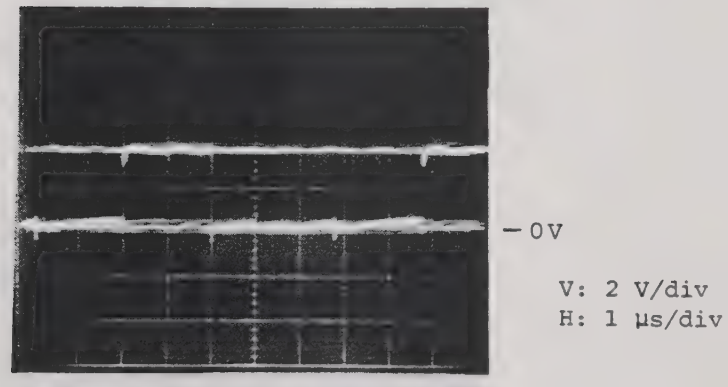


Fig. 3-5 Waveform at ❹

[Step 4]

Check the voltage between ❺ and ground using a DC voltmeter. A voltage within the range of +2.5 to +4 V it is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Z2 and R57.

[Step 5]

Check the waveform between ❻ and FG using an oscilloscope.

The waveform shown in Fig. 3-6 is normal.

Also, check that the voltage between ❻ and FG is within the range of +30 to +50 V (at AC operation).

If both the waveform and voltage are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❻.

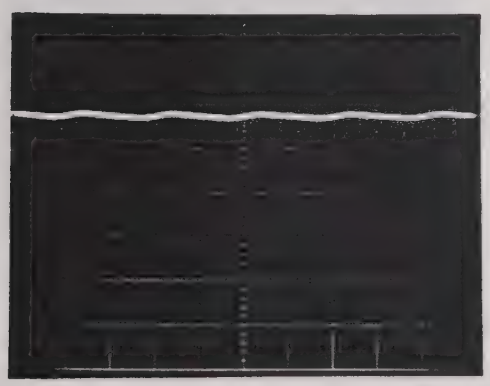


Fig. 3-6 Waveform at ❻

[Step 6]

Check the voltage between ❼ and FG using a DC voltmeter.

A voltage within the range of +13 to +18 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❼ .

[Step 7]

Check the waveform between ❽ and FG using an oscilloscope.

The waveform shown in Fig. 3-7 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❽ .

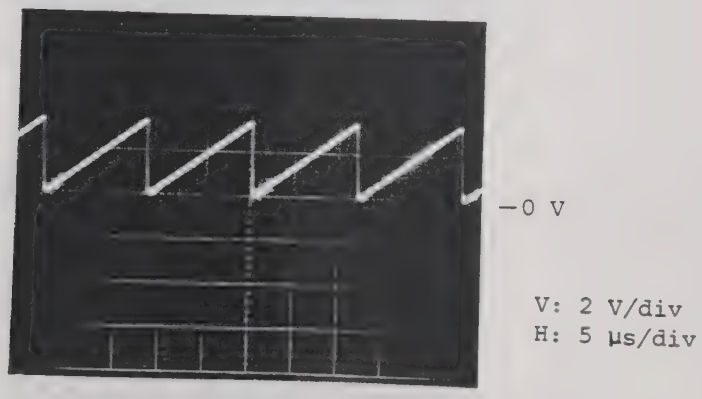


Fig. 3-7 Waveform at ❽

[Step 8]

Check the waveforms between ❾ , ❿ and FG using an oscilloscope. The waveform shown in Fig. 3-8 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❾ and ❿ .

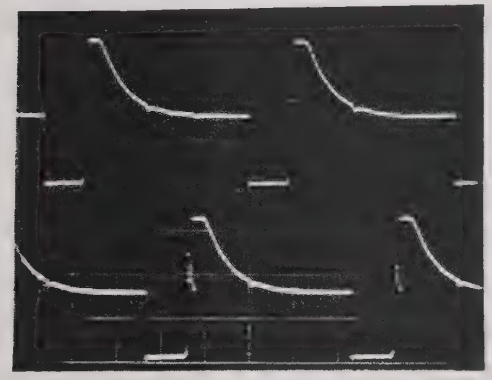


Fig. 3-8 Waveforms at ❾ and ❿

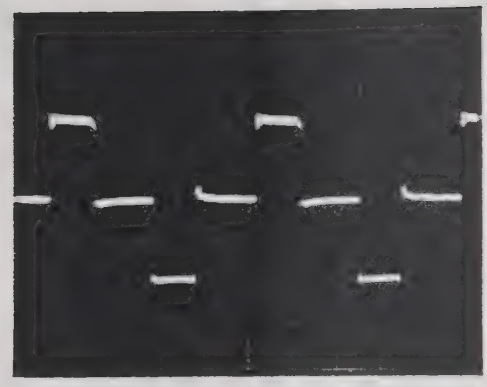
[Step 9]

Check the waveform between ⓫ and FG using an oscilloscope.

The waveform shown in Fig. 3-9 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ⓫ .



V: 20 V/div

H: 5 µs/div

Fig. 3-9 Waveform at ⓫

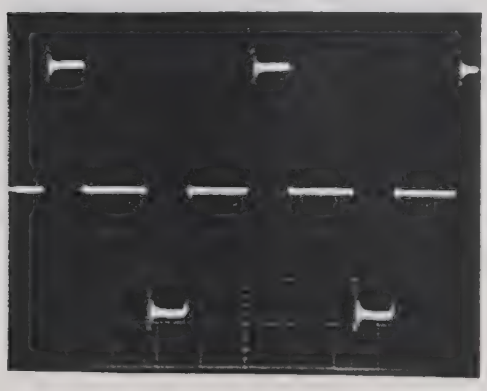
[Step 10]

Check the waveform between ⓬ and FG using an oscilloscope.

The waveform shown in Fig. 3-10 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ⓬.



V: 5 V/div

H: 5 µs/div

Fig. 3-10 Waveform at ⓬

[Step 11]

Check the voltage between ⑯ and ground using a DC voltmeter.

A voltage within the range of -5.0 to -5.5 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, adjust R40.

If it is still abnormal, troubleshoot circuits ⑫ to ⑯ and ⑰ to ⑮ and the circuits related to R40.

[Step 12]

Check the voltage between ⑬, ⑭, ⑮, and ground using a DC voltmeter.

Test Point	Voltage range
⑬	+4.8 V to +5.5 V
⑭	-11.4 V to -12.6 V
⑮	+11.4 to +12.6 V

A voltage within the above range is normal and A2 is normal.

If it is abnormal, troubleshoot the circuits related to ⑬, ⑭, and ⑮.

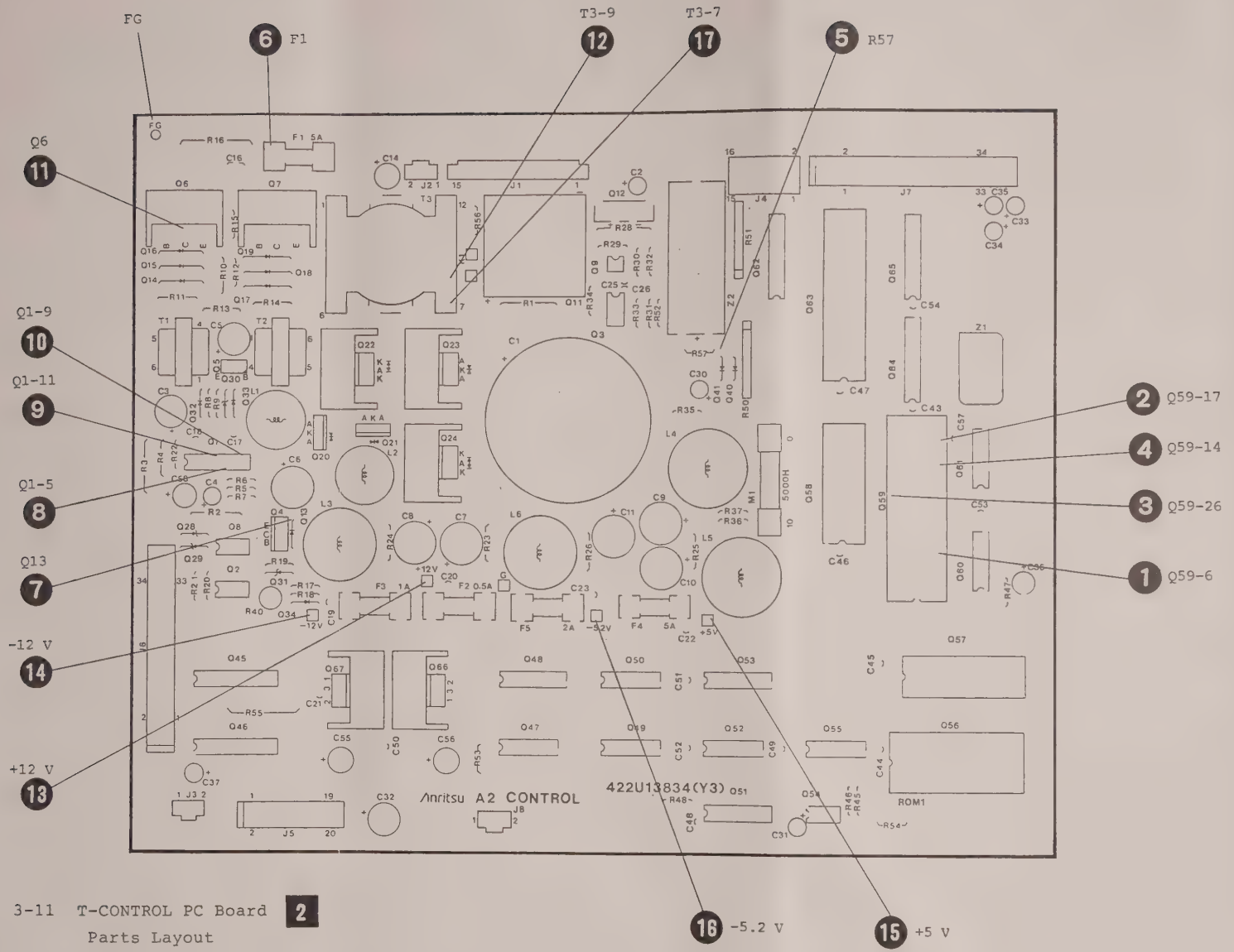
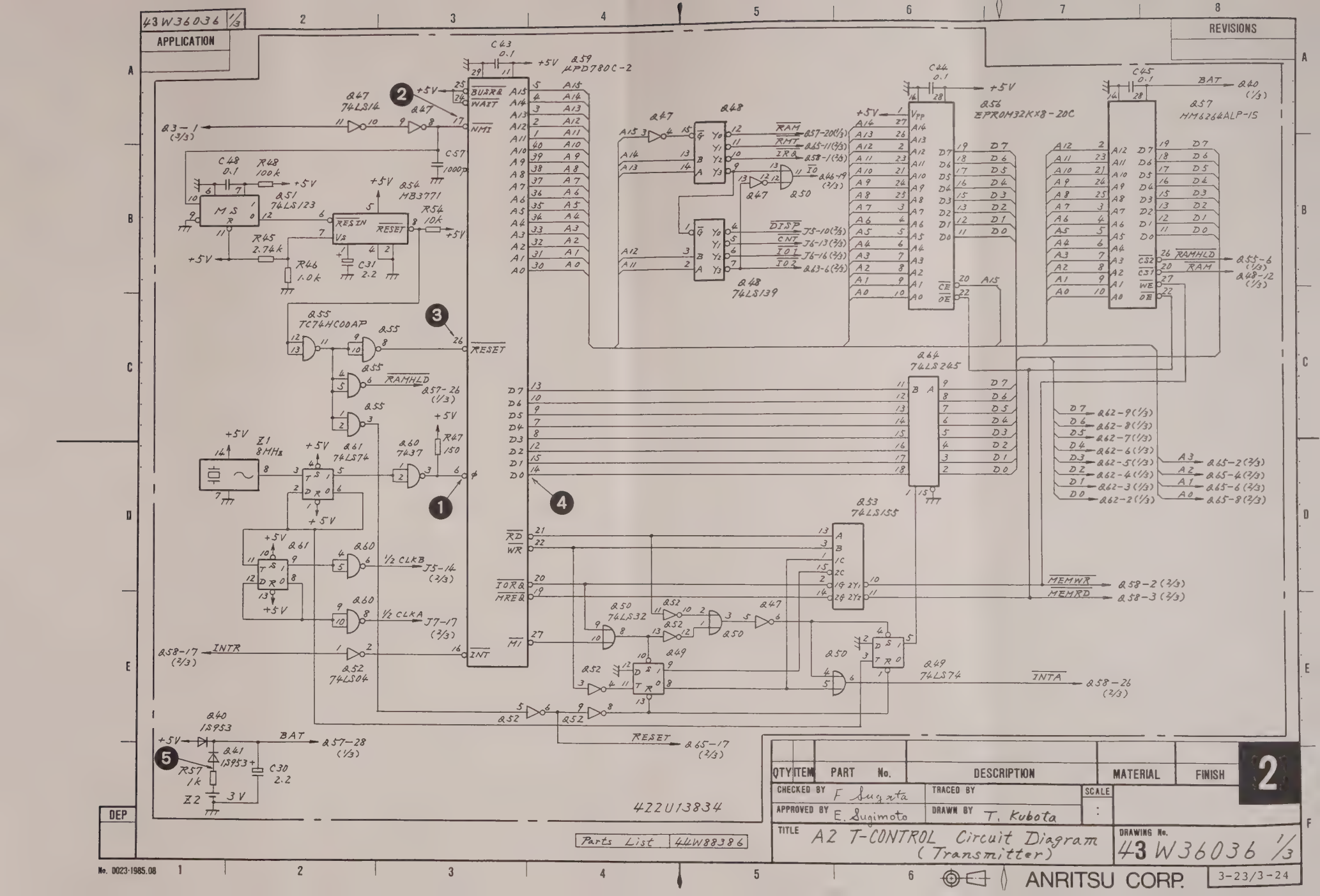
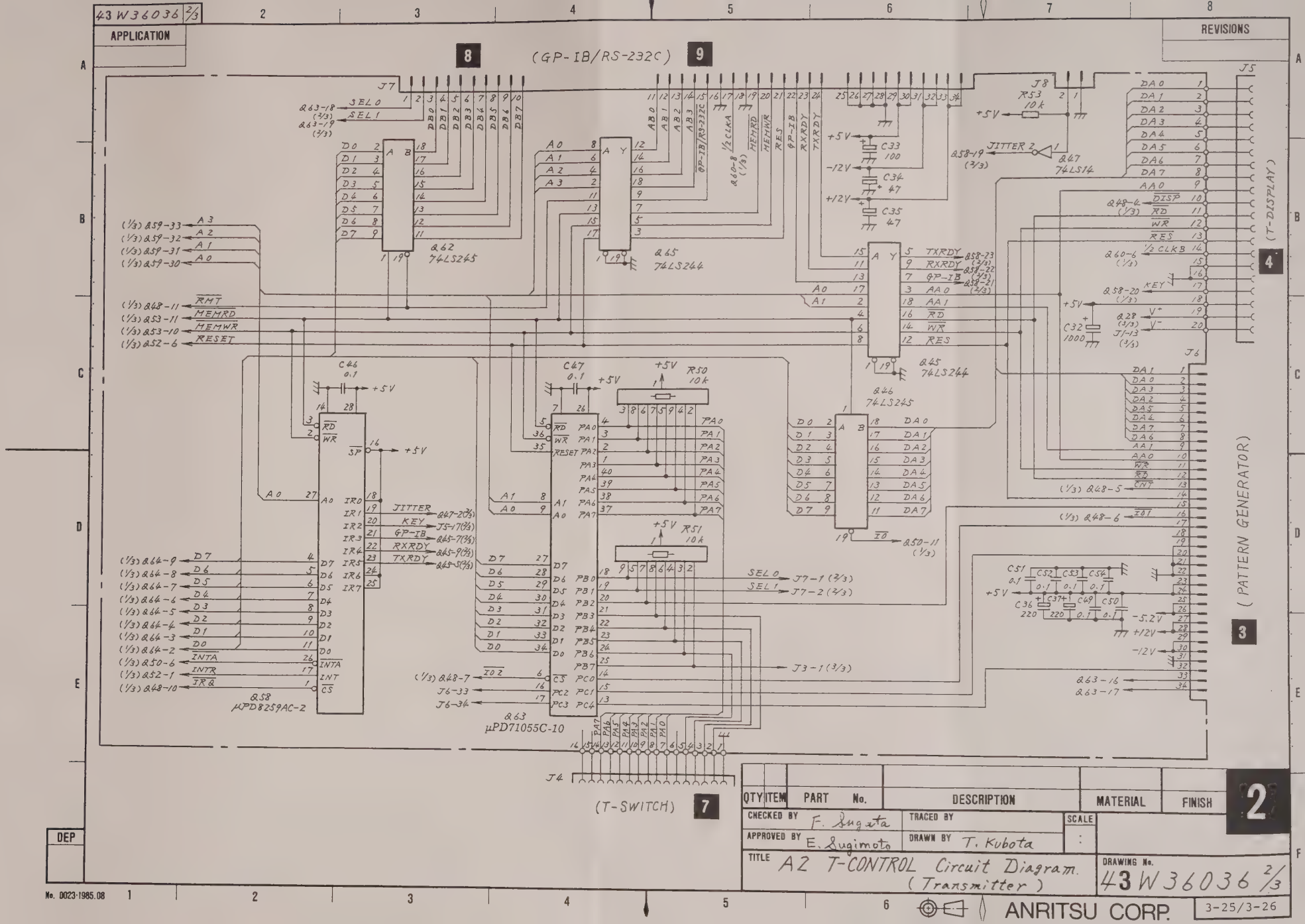
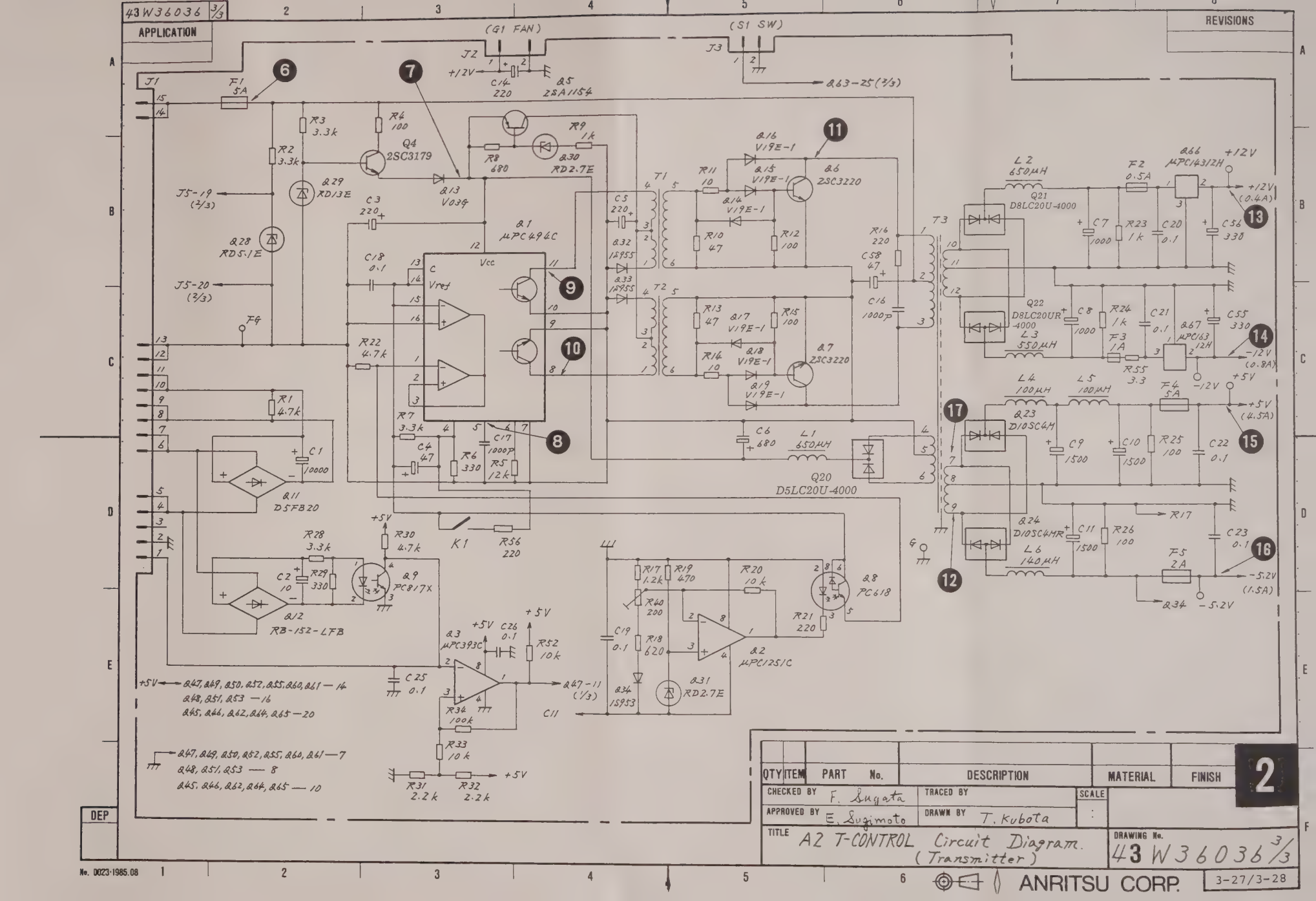


Fig. 3-11 T-CONTROL PC Board 2
Parts Layout


43W36036 1/3
APPLICATION
REVISIONS
DEP
Parts List 44W88386
4ZZU13834
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY F Sugata
TRACED BY
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota
SCALE :
TITLE A2 T-CONTROL Circuit Diagram (Transmitter)
DRAWING No. 43W36036 1/3
ANRITSU CORP.
3-23/3-24
No. 0023-1985.08
μPD780C-2
EPROM32KX8-20C
HM6264ALP-15
74LS139
74LS245
74LS155
74LS32
74LS04
74LS74
74LS123
74LS14
74LS174
74LS00AP
74LS37
MB3771
TC74HC00AP
8MHz
3V


43W36036 2/3
APPLICATION
REVISIONS
(GP-IB/RS-232C)
(T-DISPLAY)
(PATTERN GENERATOR)
(T-SWITCH)
Q62 74LS245
Q65 74LS244
Q45 74LS244
Q46 74LS245
Q47 74LS14
Q58 μPD8259AC-2
Q63 μPD71055C-10
C46 0.1
C47 0.1
C33 100
C34 47
C35 47
C32 1000
C36 220
C37 220
C49
C50
C51
C52
C53
C54
R50 10k
R51 10k
R53 10k
+5V
-12V
+12V
-5.2V
SEL0
SEL1
JITTER
KEY
GP-IB
RXRDY
TXRDY
RMT
MEMRD
MEMWR
RESET
INTA
INTR
IRQ
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY F. Sugata
APPROVED BY E. Sugimoto
TRACED BY
DRAWN BY T. Kubota
SCALE
TITLE A2 T-CONTROL Circuit Diagram. (Transmitter)
DRAWING No. 43W36036 2/3
No. 0023-1985.08
ANRITSU CORP.
3-25/3-26


43W36036 3/3
APPLICATION
REVISIONS
(G1 FAN)
(S1 SW)
J1
J2
J3
F1 5A
C14 220
Q5 2SA1154
+12V
Q63-25(2/3)
R3 3.3k
R4 100
Q4 2SC3179
R2 3.3k
R8 680
R9 1k
Q30 RD2.7E
Q29 RD13E
Q13 V03G
J5-19 (2/3)
Q28 RD5.1E
J5-20 (2/3)
C3 220
Q1 μPC494C
Vcc
Vref
C18 0.1
R22 4.7k
F6
R1 4.7k
C1 10000
Q11 D5FB20
R7 3.3k
C4 47
R6 330
C17 1000P
R5 12k
K1
R56 220
C6 680
L1 650μH
Q20 D5LC20U-4000
T1
T2
T3
C5 220
C32 1SS55
C33 1SS55
R11 10
R10 47
R12 100
R13 47
R14 10
R15 100
Q16 V19E-1
Q15 V19E-1
Q14 V19E-1
Q17 V19E-1
Q18 V19E-1
Q19 V19E-1
Q6 2SC3220
Q7 2SC3220
R16 220
C58 47
C16 1000P
L2 650μH
Q21 D8LC20U-4000
F2 0.5A
Q66 μPC1431/2H
C7 1000
R23 1k
C20 0.1
C56 330
Q22 D8LC20UR-4000
L3 550μH
C8 1000
R24 1k
C21 0.1
Q67 μPC1631/2H
C55 330
F3 1A
R55 3.3
L4 100μH
L5 100μH
F4 5A
Q23 D10SC4M
C9 1500
C10 1500
R25 100
C22 0.1
Q24 D10SC4MR
L6 140μH
C11 1500
R26 100
F5 2A
C23 0.1
Q34
R17
+5V
+12V (0.4A)
-12V (0.8A)
+5V (4.5A)
-5.2V (1.5A)
R28 3.3k
R30 4.7k
C2 10
R29 330
Q9 PC817X
Q12 RB-152-LFB
Q3 μPC393C
C26 0.1
R52 10k
C25 0.1
R34 100k
R33 10k
R31 2.2k
R32 2.2k
+5V
Q47-11 (1/3)
C11
R17 1.2k
R19 470
R40 200
C19 0.1
R18 620
Q34 1SS53
Q31 RD2.7E
R20 10k
R21 220
Q8 PC618
Q2 μPC1251C
Q47, Q49, Q50, Q52, Q55, Q60, Q61 — 14
Q48, Q51, Q53 — 16
Q45, Q46, Q62, Q64, Q65 — 20
Q47, Q49, Q50, Q52, Q55, Q60, Q61 — 7
Q48, Q51, Q53 — 8
Q45, Q46, Q62, Q64, Q65 — 10
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY F. Sugata
TRACED BY
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota
SCALE
TITLE A2 T-CONTROL Circuit Diagram. (Transmitter)
DRAWING No. 43W36036 3/3
2
No. 0023-1985.08
ANRITSU CORP.
3-27/3-28

3.5.3 A1 PATTERN GENERATOR PC Board 3

(1) Circuit description

Figure 3-12 shows the block diagram of this circuit.

A1 PATTERN GENERATOR circuit consists of the CLOCK SIGNAL GENERATOR circuit, PATTERN/FRAME GENERATOR circuit, ERROR ADDITION circuit, CODE CONVERTER circuit, U/B CONVERTER circuit, DELAY circuit and UNIPOLAR OUTPUT circuit.

The CLOCK GENERATOR circuit generates four internal clock (44.736, 6.312, 3.152 and 1.544 MHz) and selects one clock signal from the four internal clocks and one external clock signal (1 to 50 MHz).

The PATTERN/FRAME GENERATOR circuit and generates a pattern (PRBS, 1111, 1100, 1010, 1000) and frame corresponding to each bit rate.

The ERROR ADDITION circuit divides the clock signal, generates an error pulse and adds a 1-bit error to the NRZ signal. For an external error, a 1-bit error or burst error is added.

The UNIPOLAR OUTPUT circuit shapes the waveform of the NRZ pattern signal and clock signal and outputs them after level conversion (TTL, +/-1 V, or ECL). The number of outputs is one system for each clock signal and data signal.

The CODE CONVERTER circuit converts the NRZ pattern sginal to the signal that has the code corresponding to each bit rate (B3ZS for DS-3, B6ZS for DS-2, and B8ZS for DS-1) and branches the converted signal into + and - routes.

The UNIPOLAR to BIPOLAR CONVERTER circuit converts the branched NRZ signal to the RZ signal and bipolar signal, and outputs the converted signal. The DS-3 signal is output to six unbalanced output connectors. For each output, the phase is delayed by 3 bits in order No.1 to No.6 in the DELAY circuit.

The DS-1/DS-1C/DS-2 signal is output to one balanced output connector.

The clock, pattern, and frame are output synchronously.

The clock signal is output to the A4 JITTER MODULATION circuit and the modulated clock signal and external data signal are input from the A4 JITTER MODULATION circuit.

There is also an X-bit input signal.

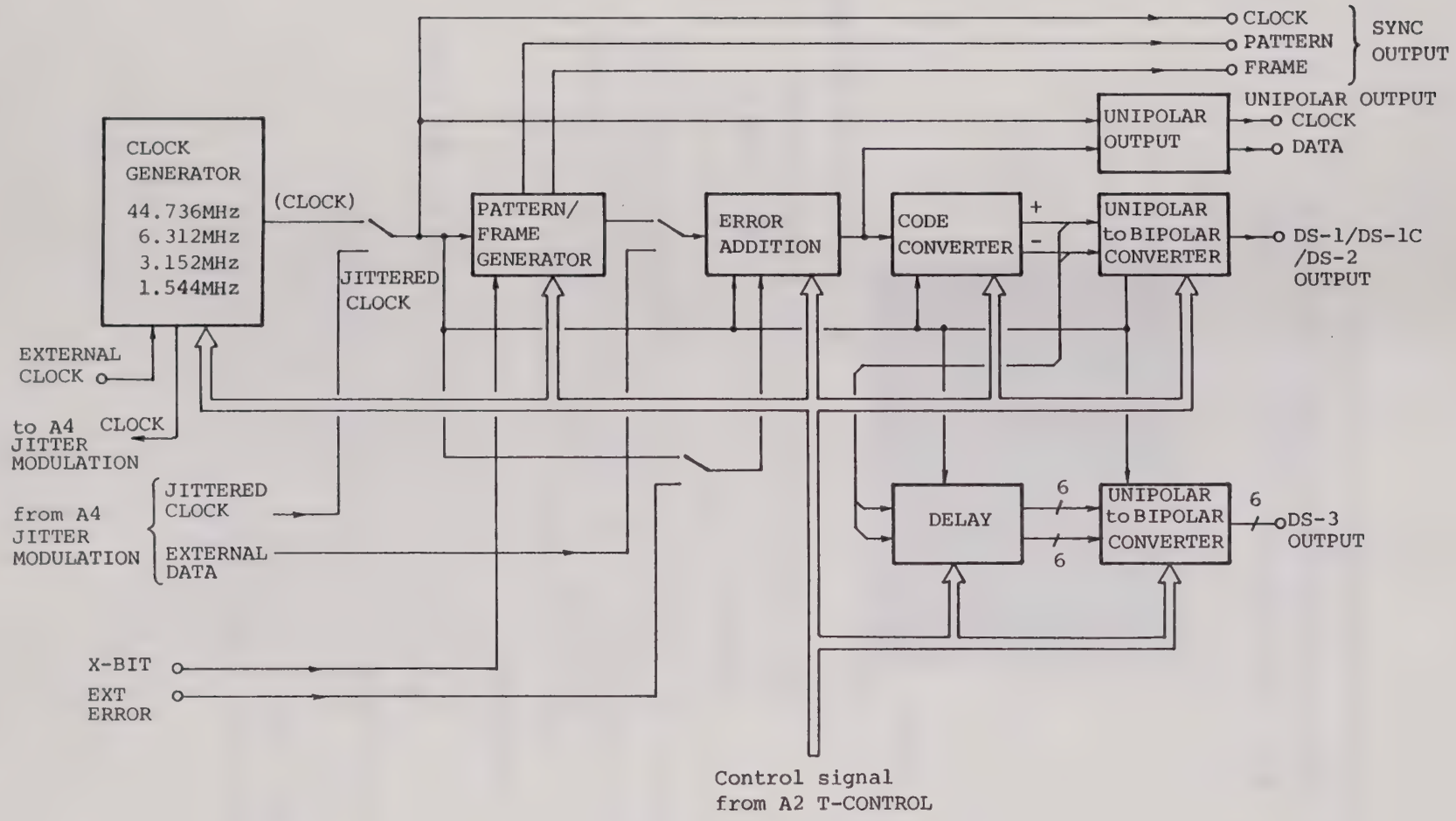


Fig. 3-12 A1 PATTERN GENERATOR Block Diagram

(2) Troubleshooting and adjustment

(a) Checking DS-3 output

Panel setting

CLOCK	:	DS-3
JITTER MODULATION	:	OFF
DS-3 LEVEL	:	HIGH
FUNCTION SWITCH (Rear panel): All "0"		

[Step 1]

Check the waveform at ❶ using an oscilloscope.

The waveform shown in Fig. 3-13 is normal. Also, check the frequency at ❶ using a frequency counter.

A frequency within the range of 44.735560 to 44.736440 MHz is normal. If it is normal, proceed to the next step. If it is abnormal, make the following adjustment.

Adjustment

1. Adjust R45 so that the waveform at ❶ is as shown in Fig. 3-13.
2. Adjust C15 to match the frequency.

If the frequency is abnormal even after the above adjustments ❶ and ❷ have been made, troubleshoot the circuits related to X1 to ❶.

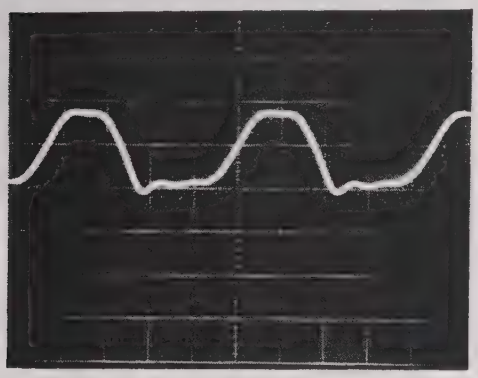


Fig. 3-13 Waveform at ❶ (DS-1)

CAUTION

When waveforms are observed using an oscilloscope, accurate waveforms cannot be observed unless the oscilloscope probe earth lead is connected to the nearest earth point to the measuring point.

[Step 2]

Check the waveform at ❻ using an oscilloscope.

The waveform shown in Fig. 3-14 is normal.
If it is normal, proceed to the next step.
If it is abnormal, troubleshoot the circuits related to ❶ to ❻.

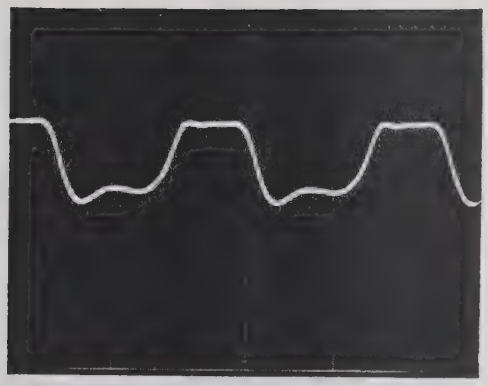


Fig. 3-14 Waveform at ❻

[Step 3]

Check the waveforms and phases at ❽ and ❿ using an oscilloscope. The waveform and phase shown in Fig. 3-15 are normal.

If they are normal, proceed to the next step. If they are abnormal, troubleshoot the circuits related to ❶ to ❿ and Q101.

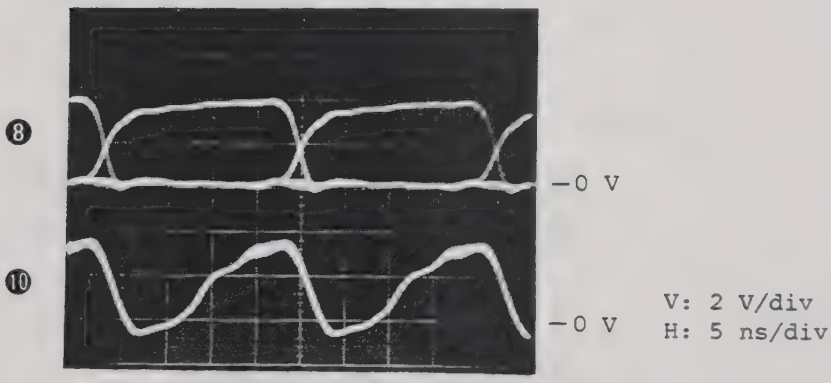


Fig. 3-15 Waveforms at ❽ and ❿

[Step 4]

Check the waveforms and phases at ⑯ and ⑰ using an oscilloscope. The waveform and phase shown in Fig. 3-16 are normal. If they are normal, proceed to the next step. If they are abnormal, make the following adjustment.

Adjustment

Adjust R47, R48, and R49 so that the waveform at ⑯ is as shown in Fig. 3-16. If it is not normal after the above adjustment has been made, troubleshoot the circuits related to ❶ to ⑯, Q121 to Q122, Q119 to Q120, and Q119 to Q118.

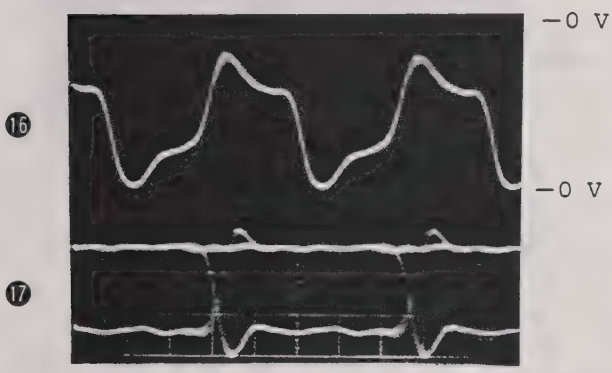


Fig. 3-16 Waveforms at ⑯ and ⑰

[Step 5]

Check the waveforms at ⑱ and ⑲ using an oscilloscope pribe. The waveforms shown in Fig. 3-17 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q122 to Q110, Q120 to Q109, and Q118 to Q107.

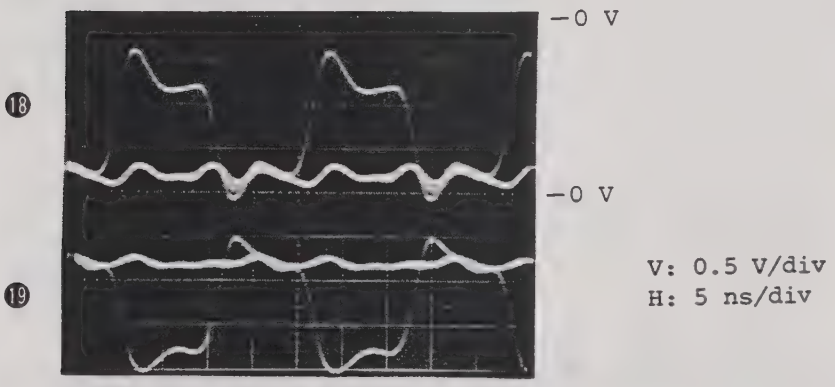


Fig. 3-17 Waveforms at ⑱ and ⑲

[Step 6]

Check the DS-3 output waveform. Set-up shown in Fig. 3-18.

The waveform shown in Fig. 3-19 is normal.

If it is normal, the DS-3 output waveform is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the level.

Table 3-6 DS-3 OUTPUT Adjustment

DS-3 OUTPUT	LEVEL		DUTY	
	+Pulse	-Pulse	+Pulse	-Pulse
1 (J8)	R281	R282	R390	R391
2 (J9)	R283	R284	R392	R393
3 (J10)	R285	R286	R394	R395
4 (J11)	R287	R288	R396	R397
5 (J12)	R289	R290	R398	R399
6 (J13)	R291	R292	R400	R401

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J8 to J13.

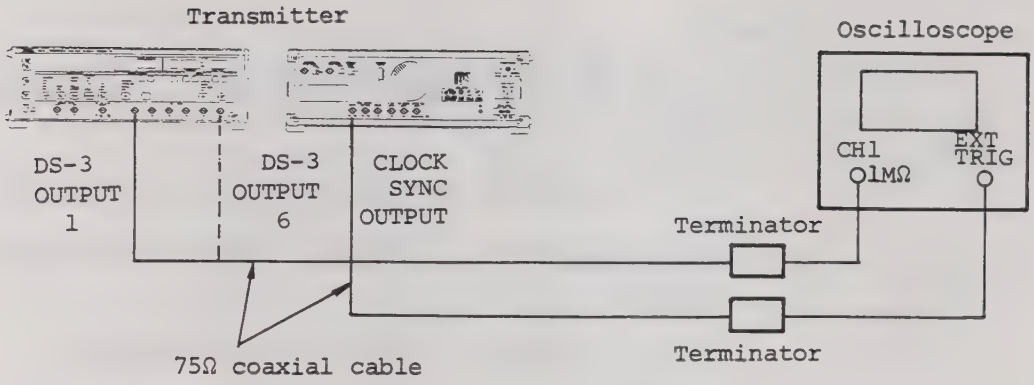


Fig. 3-18 Setup

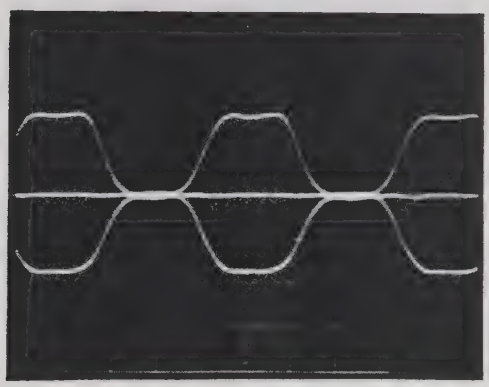


Fig. 3-19 DS-3 OUTPUT

(b) Checking DS-2 output

Panel setting

CLOCK	: DS-2
JITTER MODULATION:	OFF
FUNCTION SWITCH A (Rear Panel):	All "0"

[Step 1]

Check the waveform at ❶ using an oscilloscope.

The waveform shown in Fig. 3-20 is normal.

Also, check the frequency at ❶ using the frequency counter.

A frequency in the range of 6.311937 to 6.312063 MHz is normal.

If it is normal, proceed to the next step.

If the frequency is abnormal, make the following adjustement.

Adjustment

Adjust C16 to match the frequency.

If the frequency is abnormal after the above adjustment has been made, troubleshoot the circuits related to X2 to ❶ .

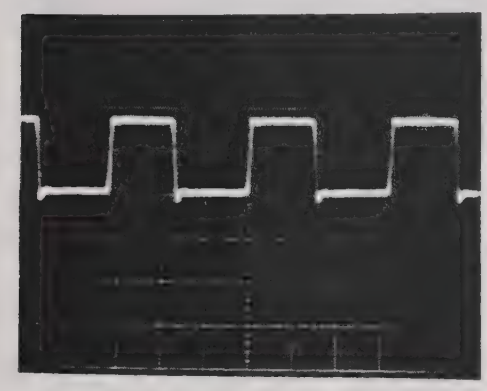


Fig. 3-20 Waveform at ❶

[Step 2]

Check the waveforms at ⑭ and ⑮ using an oscilloscope. The waveforms shown in Fig. 3-21 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ① to ⑭ and ① to ⑮.

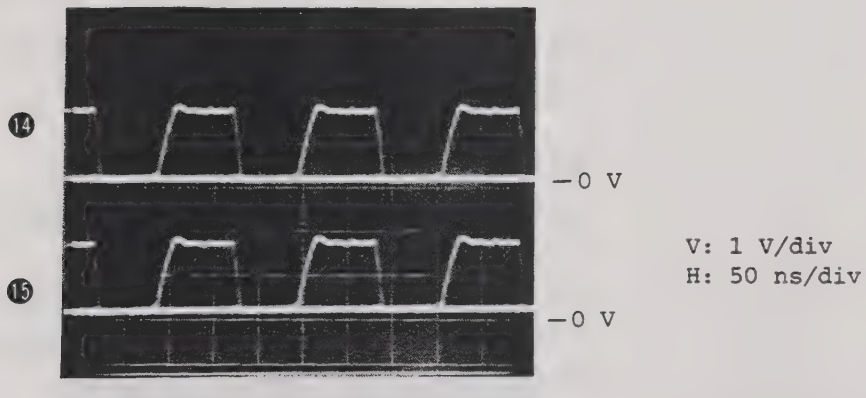


Fig. 3-21 Waveforms at ⑭ and ⑮

[Step 3]

Check the DS-2 output waveform. Set-up as shown in Fig. 3-22.

The waveform shown in Fig. 3-23 is normal.

If it is normal, DS-2 is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the output level at R294 while checking the output waveform.
If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to ⑭ and ⑮ to J7.

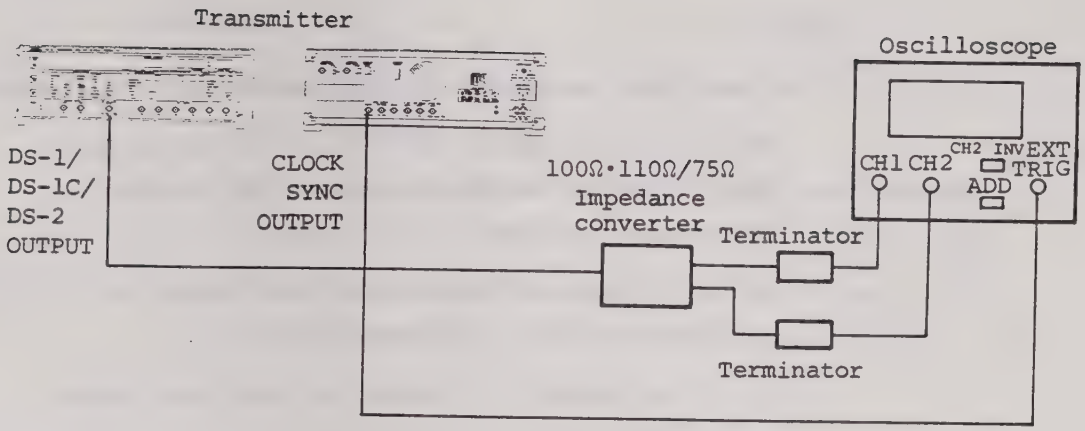


Fig. 3-22 Setup

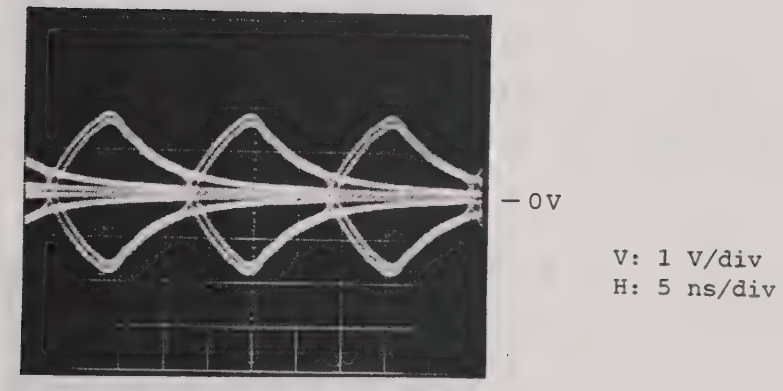


Fig. 3-23 DS-2 OUTPUT

(c) Checking DS-1C output

Panel setting

CLOCK	: DS-1C
JITTER MODULATION:	OFF
FUNCTION SWITCH A (Rear Panel):	All "0"

[Step 1]

Check the waveform at ❶ using an oscilloscope.

The waveform shown in Fig. 3-24 is normal. Also, check the frequency at ❶ using a frequency counter.

If the frequency is within the range of 3.151969 to 3.152031 MHz is normal.

If it is normal, proceed to the next step.

If the frequency is abnormal, make the following adjustment.

Adjustemnt

Adjust C17 to match the frequency.

If the frequency is abnormal after the above adjustment has been made, troubleshoot the circuits related to X3 to ❶.

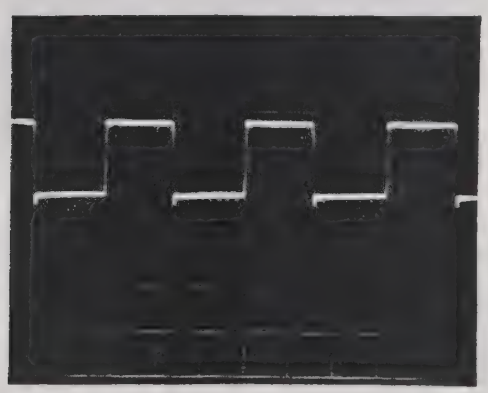


Fig. 3-24 Waveform at ❶

[Step 2]

Check the waveforms at ⓮ and ⓯ using an oscilloscope.

The waveforms shown in Fig. 3-25 are normal.
If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❶ to ⓮ and ⓯.

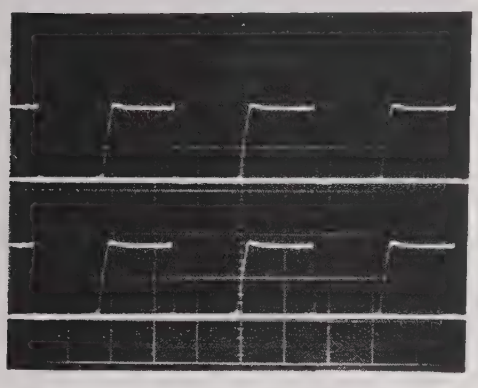


Fig. 3-25 Waveforms at ⓮ and ⓯

[Step 3]

Check the DS-1C output waveform.

Connect as shown in Fig. 3-22.

The waveform shown in Fig. 3-26 is normal.
If the waveform is normal, DS-1C is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the output level at R293 while checking the output waveform.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to ⓮ and ⓯ to J7.

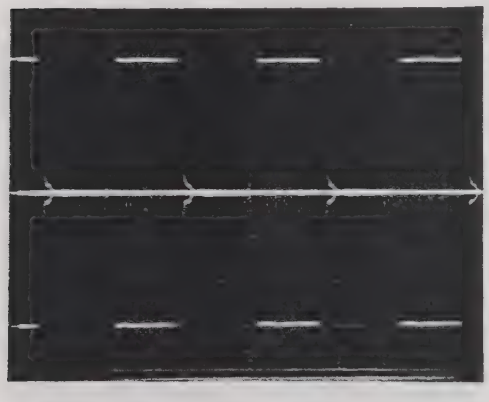


Fig. 3-26 DS-1C OUTPUT

(d) Checking DS-1 output

Panel setting

CLOCK : DS-1
JITTER MODULATION: OFF
FUNCTION SWITCH A (Rear panel): All "0"

[Step 1]

Check the waveform at ❶ using an oscilloscope probe.

The waveform shown in Fig. 3-27 is normal.

Also, check the frequency at ❶ using a frequency counter.

A frequency in the range of 1.543985 to 1.544015 MHz is normal.

If it is normal, proceed to the next step.

If the frequency is abnormal, make the following adjustment.

Adjustment

Adjust C18 to match the frequency.

If the frequency is abnormal after the above adjustment has been made, troubleshoot the circuits related to X4 to ❶ .

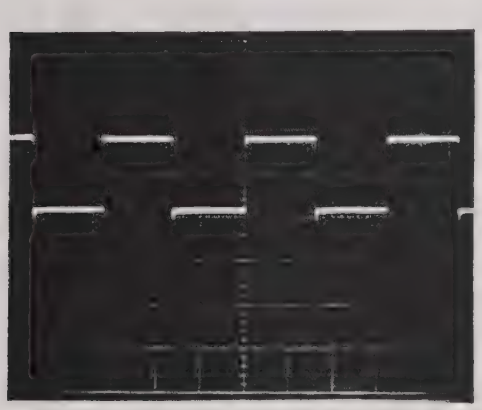


Fig. 3-27 Waveform at ❶

[Step 2]

Check the waveforms at ⓮ and ⓯ using an oscilloscope.

The waveform shown in Fig. 3-28 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits 1 to ⓮ and ⓯.

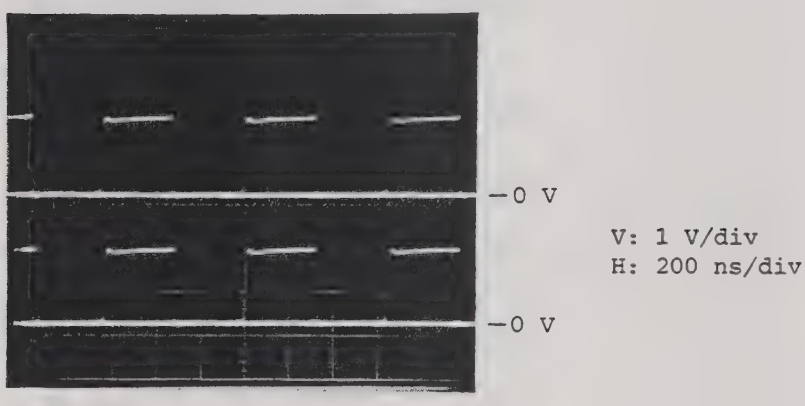


Fig. 3-28 Waveforms at ⓮ and ⓯

[Step 3]

Check the DS-1 output waveform.

Set-up as shown in Fig. 3-22.

The waveform shown in Fig. 3-29 is normal.

If the waveform is normal, DS-1 is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the output level at R293 while checking the output waveform.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to ⓮, ⓯ to J7.

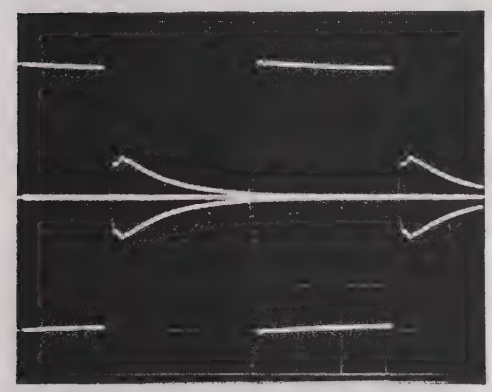


Fig. 3-29 DS-1 OUTPUT

(e) Checking unipolar output

Panel setting

CLOCK	: DS-3
JITTER MODULATION:	OFF
UNIPOLAR OUTPUT LEVEL (Rear Panel):	+1/-1 V
FUNCTION SWITCH A (Rear Panel)	: All "0"

[Step 1]

Perform the same check as described in paragraph 3.5.3 (2) (a) [Step 1] and [Step 2].

[Step 2]

Check the waveforms and phases at ❼ and ❿ using an oscilloscope.

The waveforms and phases shown in Fig. 3-30 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❶ to ❿, and Q101.

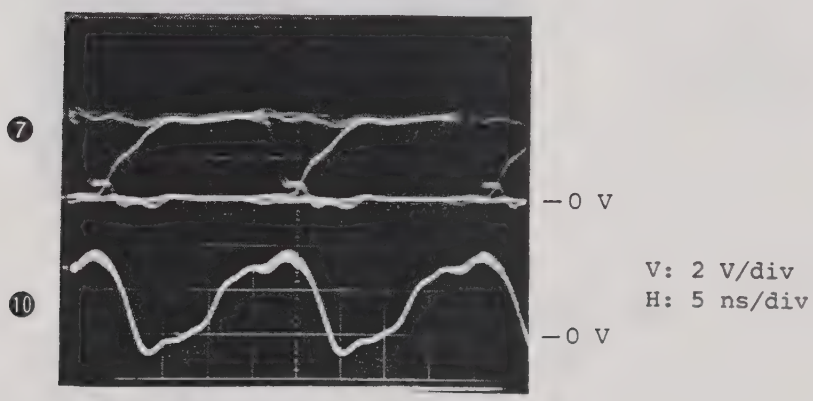


Fig. 3-30 Waveforms at ❼ and ❿

[Step 3]

Check the waveforms at ⓫, ⓬, and ⓭ using an oscilloscope probe.

The waveforms shown in Fig. 3-31 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q102, and Q103.

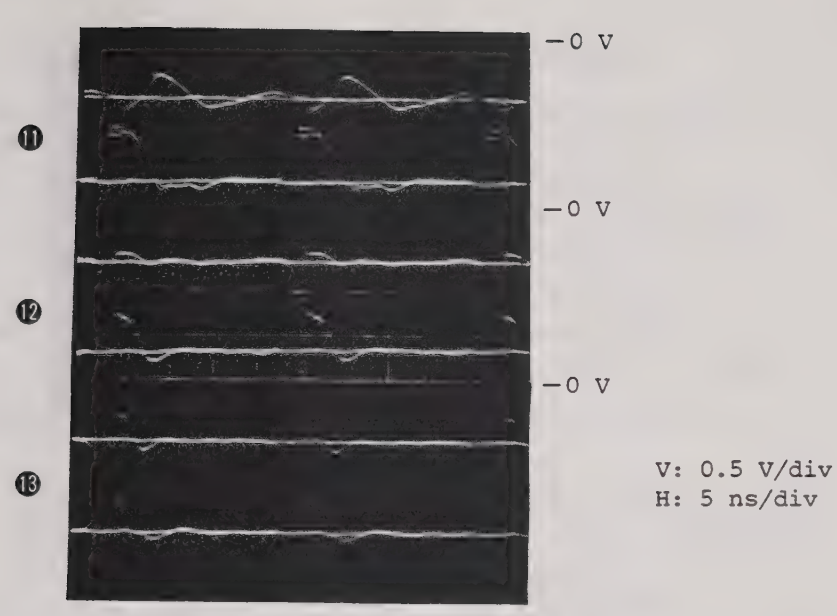


Fig. 3-31 Waveforms at ⓫, ⓬, and ⓭

[Step 4]

Check the waveform at ㉑ using an oscilloscope probe.

The waveform shown in Fig. 3-32 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❶ to ㉑.

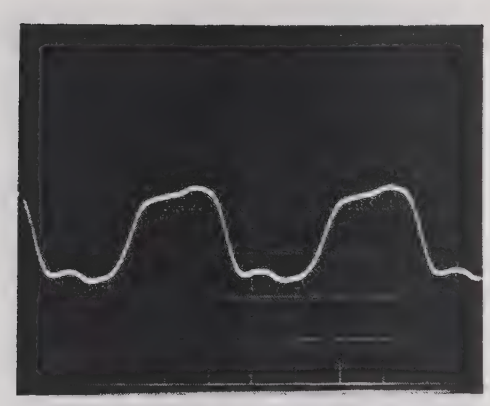


Fig. 3-32 Waveform at ㉑

[Step 5]

Check the unipolar data output and unipolar clock output waveforms.

Connect as shown in Fig. 3-33.

The waveforms and phases shown in Fig. 3-34 are normal.

If they are normal, the unipolar data output and unipolar clock output (±1 V) are normal.

If they are abnormal, make the following adjustment.

Adjustment

1. Adjust the level, offset, and duty.

Table 3-7 Unipolar Output Adjustement

UNIPOLAR OUTPUT	LEVEL		OFFSET		DUTY		
	TTL	+1/-1 V	TTL	+1/-1 V	TTL	+1/-1 V	ECL
DATA (J5)	R295	R296	R301	R302		R365	
CLOCK (J6)	R298	R299	R304	R305		R361	R368

If the waveforms and phases are abnormal after the above adjustment has been made, troubleshoot the circuits related to J5 and J6.

2. If the phase difference T shown in Fig. 3-34 is not within 3.3 ns, adjust W1.

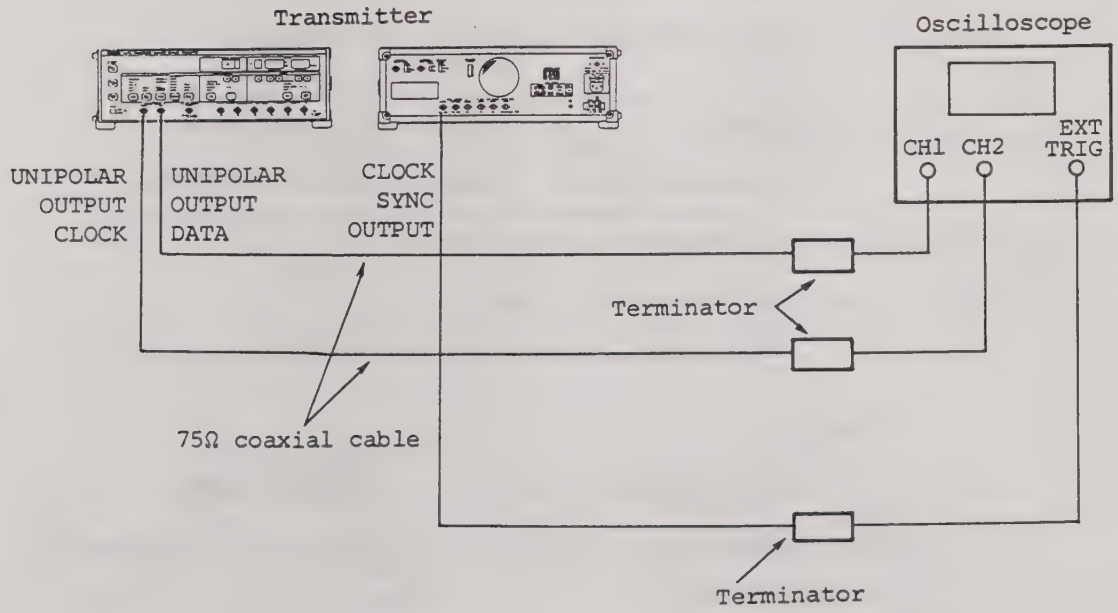


Fig. 3-33 Setup

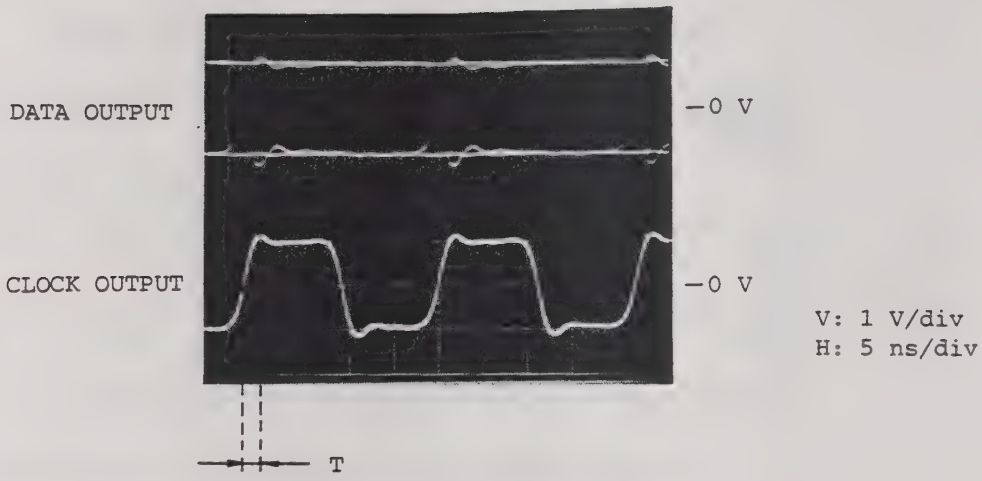


Fig. 3-34 Unipolar Output (+1/-1 V)

(f) Checking ERROR ADDITION

Panel setting

CLOCK	:	DS-3
FRAME	:	FRAMED OR UNFRAMED
ERROR ADDITION	:	ERROR RATE OR EXTERNAL
JUTTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

[Step 1]

Set the ERROR ADDITION to ERROR RATE.

Check the frequency at ❾ using a frequency counter.

The value shown in Table 3-8 is normal.
If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Q105 to ❾ and Q101.

Table 3-8 Frequency at ❾

ERROR RATE	Frame OFF	Frame ON
10^{-2}	447.360 kHz	451.879 kHz
10^{-3}	44.736 kHz	44.780 kHz
10^{-4}	4.473 kHz	4.474 kHz
10^{-5}	447 Hz	447 Hz
10^{-6}	44 Hz	44 Hz
10^{-7}	4 Hz	4 Hz
10^{-8}	0.4 Hz	0.4 Hz

[Step 2]

Set the ERROR ADDITION to EXTERNAL.

Connect as shown in Fig. 3-35.

Check the frequency at ❾ using a frequency counter.

If the frequency matches the frequency of the pulse generator, it is normal.

If it is normal, the EXTERNAL ERROR is normal.

If it is abnormal, troubleshoot the circuits related to J3-6 to ❾ and Q101.

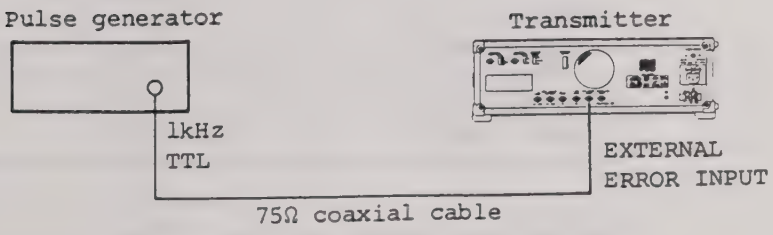


Fig. 3-35 Setup

(g) Checking X-bit input

Check the voltage at ⑳ using an oscilloscope probe.

If the voltage is as shown in Table 3-9, the X-bit input is normal.

Table 3-9 X-bit Input

Panel setting		Level at ⑳
CLOCK	FRAME	
DS-3	FRAMED	H
DS-2	FRAMED	H
DS-1C	FRAMED	H
DS-1	FRAMED D4	L
DS-1	FRAMED ESF	H

H: +2 V to +5 V
L: +0.5 V or less

If it is abnormal, troubleshoot the circuits related to J3-4 to ⑳ and Q101.

(h) Checking external clock

Panel setting

CLOCK	: EXTERNAL
JITTER MODULATION	: OFF
EXTERNAL CLOCK INPUT LEVEL (Rear Panel)	: 0.7 to 1.5 Vp-p
FUNCTION SWITCH A (Rear Panel)	: All "0"

Set-up as shown in Fig. 3-36.

Check the waveform at ❶ using an oscilloscope probe.

The waveform shown in Fig. 3-37 is normal.

If it is normal, EXTERNAL CLOCK is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R46 while checking the waveform at ❶.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J2-3 to ❶.

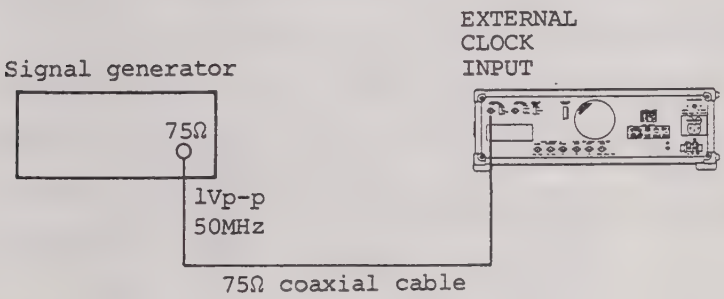


Fig. 3-36 Setup

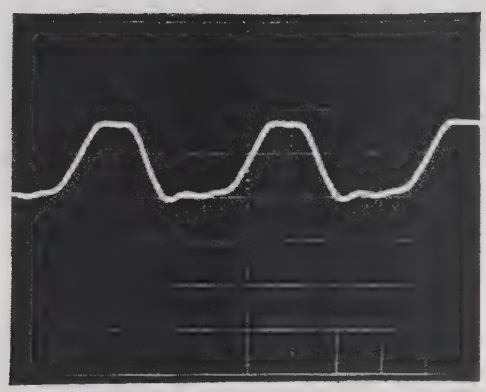


Fig. 3-37 Waveform at ❶ (External clock)

(i) Checking JITTER MODULATION (Only when OPT 01 mounted)

Panel setting

CLOCK	:	DS-3
JITTER MODULATION	:	EXTERNAL
FUNCTION SWITCH A (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❷ using an oscilloscope.

The waveform shown in Fig. 3-38 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to X1 to ❷.

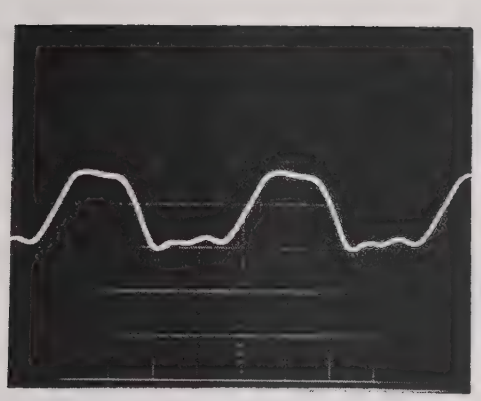


Fig. 3-38 Waveform at ❷

[Step 2]

Check the waveform at ❹ using an oscilloscope.

The waveform shown in Fig. 3-39 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J14-2 to ❹ .

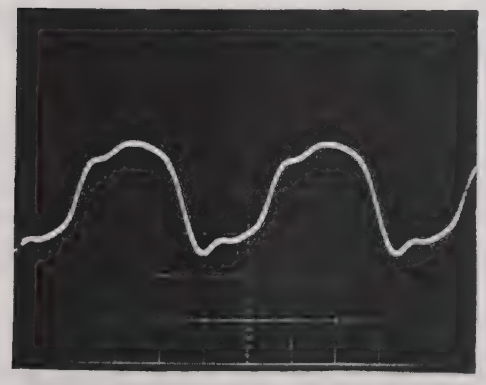


Fig. 3-39 Waveform at ❹

[Step 3]

Check the waveform at ㉒ using an oscilloscope.

The waveform shown in Fig. 3-40 is normal.

If it is normal, JITTER MODULATION is normal.

If it is abnormal, troubleshoot the circuits related to J15-1 to Q106.

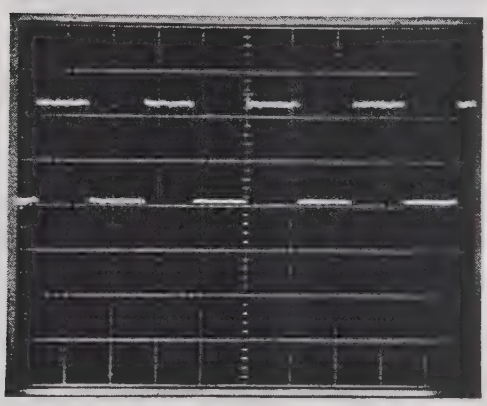


Fig. 3-40 Waveform at ㉒

(j) Checking EXTERNAL DATA (Only when OPT 01 mounted)

Panel setting

CLOCK	:	EXTERNAL
PATTERN	:	EXTERNAL
JITTER MODULATION	:	EXTERNAL
FUNCTION SWITCH A (Rear Panel)	:	All "0"
EXTERNAL CLOCK INPUT LEVEL	:	ECL
EXTERNAL DATA INPUT LEVEL	:	ECL

[Step 1]

Connect as shown in Fig. 3-41.

Check the waveform at ❸ using an oscilloscope.

The waveform shown in Fig. 3-42 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J2-6 to ❸.

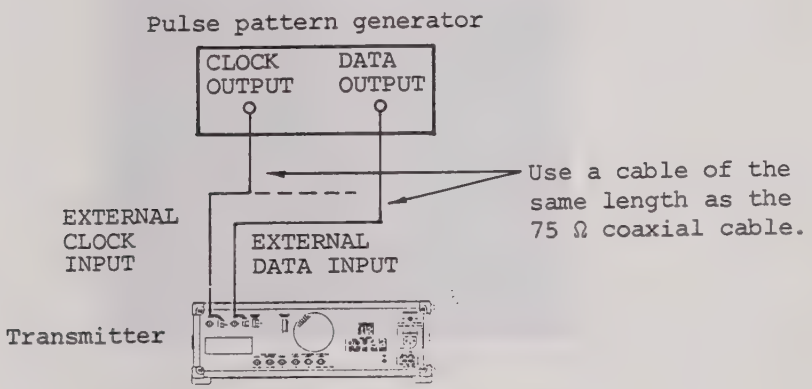


Fig. 3-41 Setup

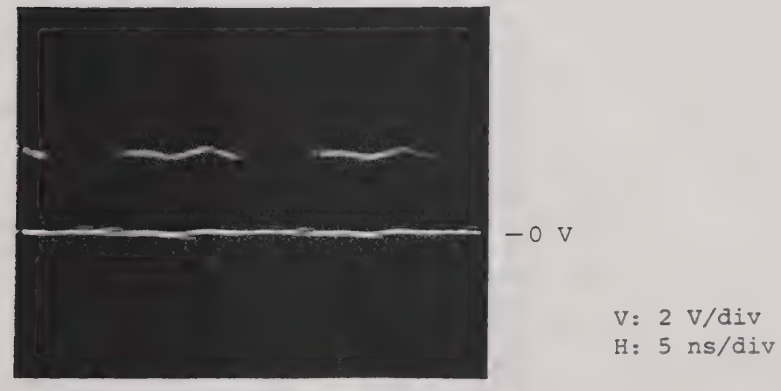


Fig. 3-42 Waveform at ❸

[Step 2]

Check the waveform at ❺ using an oscilloscope.

The waveform shown in Fig. 3-43 is normal.

If it is normal, EXTERNAL DATA is normal.

If it is abnormal, troubleshoot the circuits related to ❸ to ❺.

Fig. 3-43 Waveform at ❺

(k) Checking control signals

Panel setting

CLOCK	:	DS-3
FRAME	:	FRAMED
PATTERN	:	PRBS
DS-3 LEVEL	:	DSX-3
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Check the voltage at ㉓ using an oscilloscope probe.

The voltage shown in Table 3-10 is normal.

If it is normal, the control signal is normal.

Table 3-10 Voltage at ㉓

Test point	Voltage at ㉓
Q117-4	H
Q117-3	H
Q117-2	L
Q117-1	L
Q117-40	H
Q117-39	H
Q117-38	L
Q117-18	H
Q117-19	H
Q117-20	H
Q117-21	H
Q117-22	H
Q117-23	L
Q117-24	L
Q117-25	L
Q117-14	L
Q117-15	L
Q117-16	H
Q117-17	L
Q117-13	L
Q117-12	H
Q117-11	L
Q117-10	L

H: +2 V to +5 V
H: +0.5 V or less

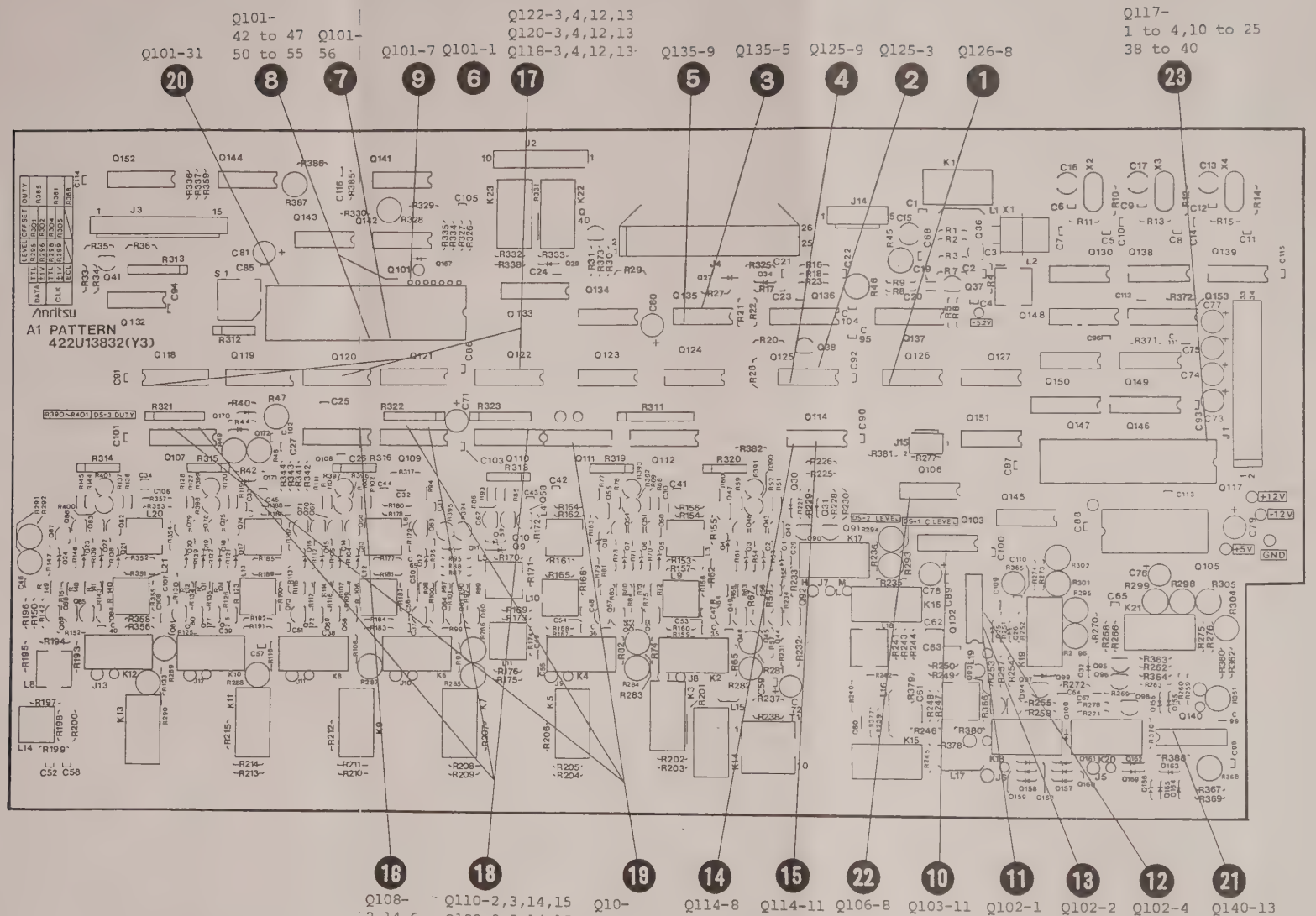
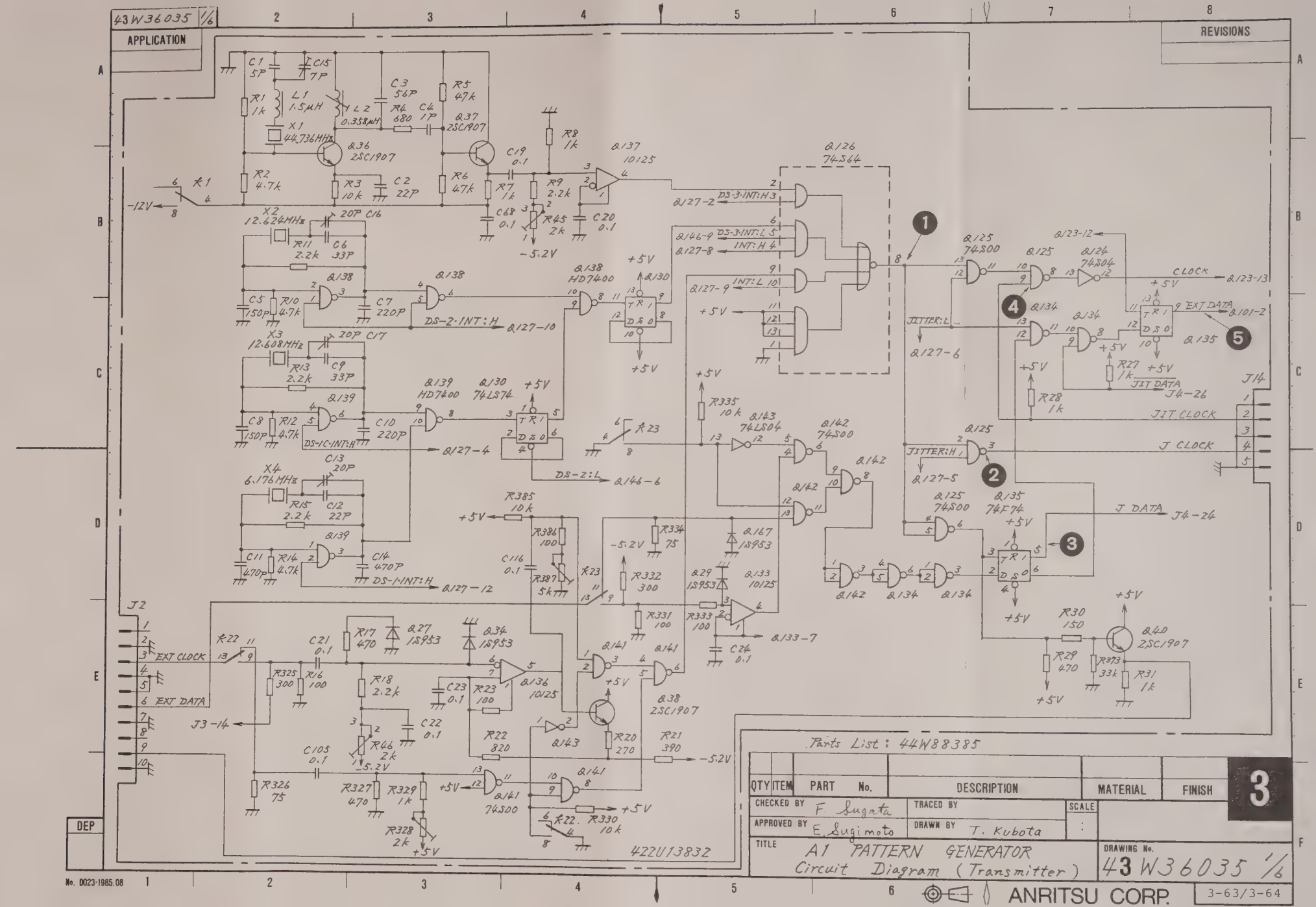


Fig. 3-44 PATTERN GENERATOR
PC Board **3**
Parts Layout


43W36035 1/6
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REVISIONS
DEP
Parts List : 44W88385
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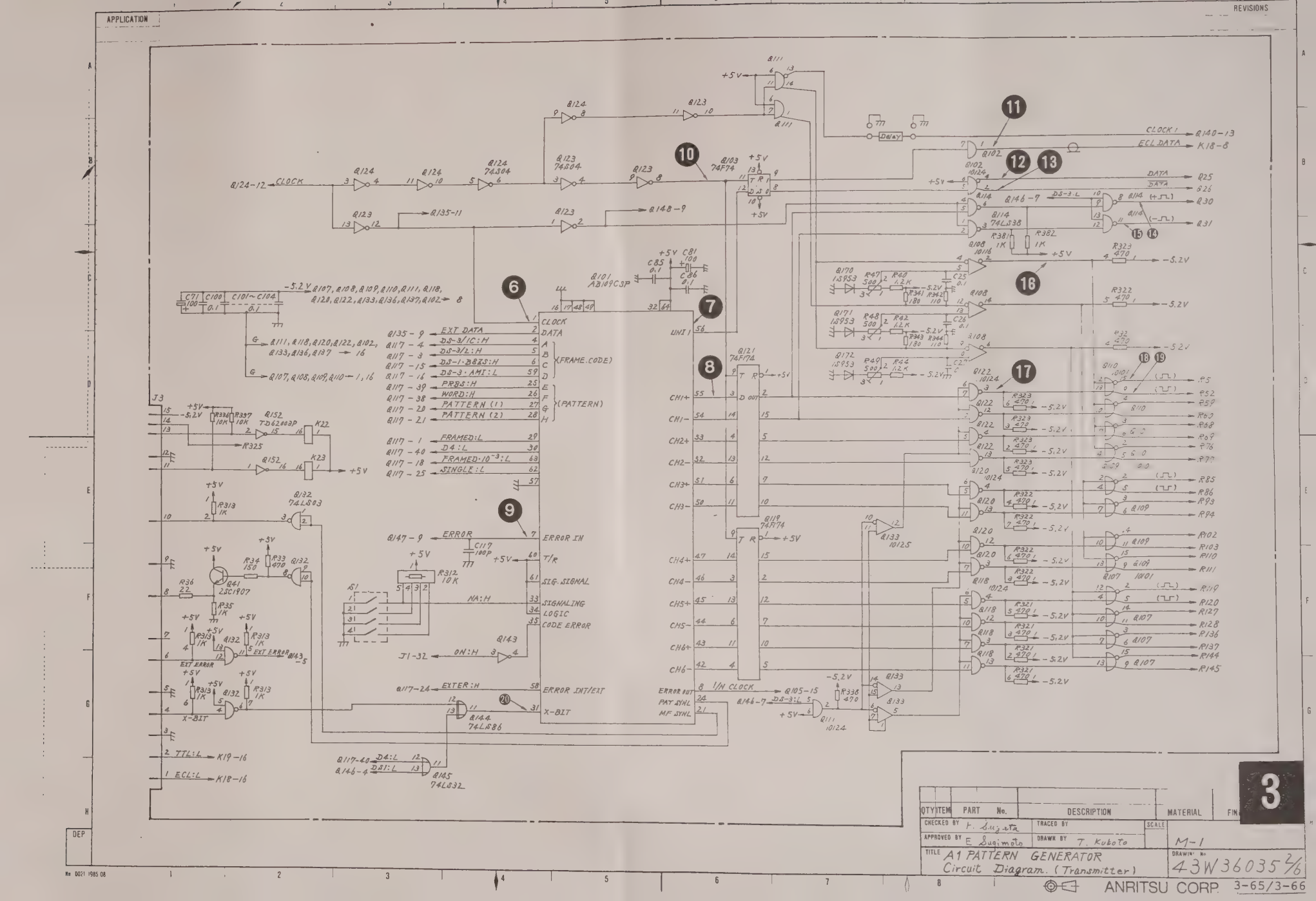
CHECKED BY F. Sugata
TRACED BY
SCALE
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota
TITLE A1 PATTERN GENERATOR Circuit Diagram (Transmitter)
DRAWING No. 43W36035 1/6
422U13832
No. 0023-1985.08
ANRITSU CORP.
3-63/3-64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REVISIONS
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CLOCK
EXT DATA
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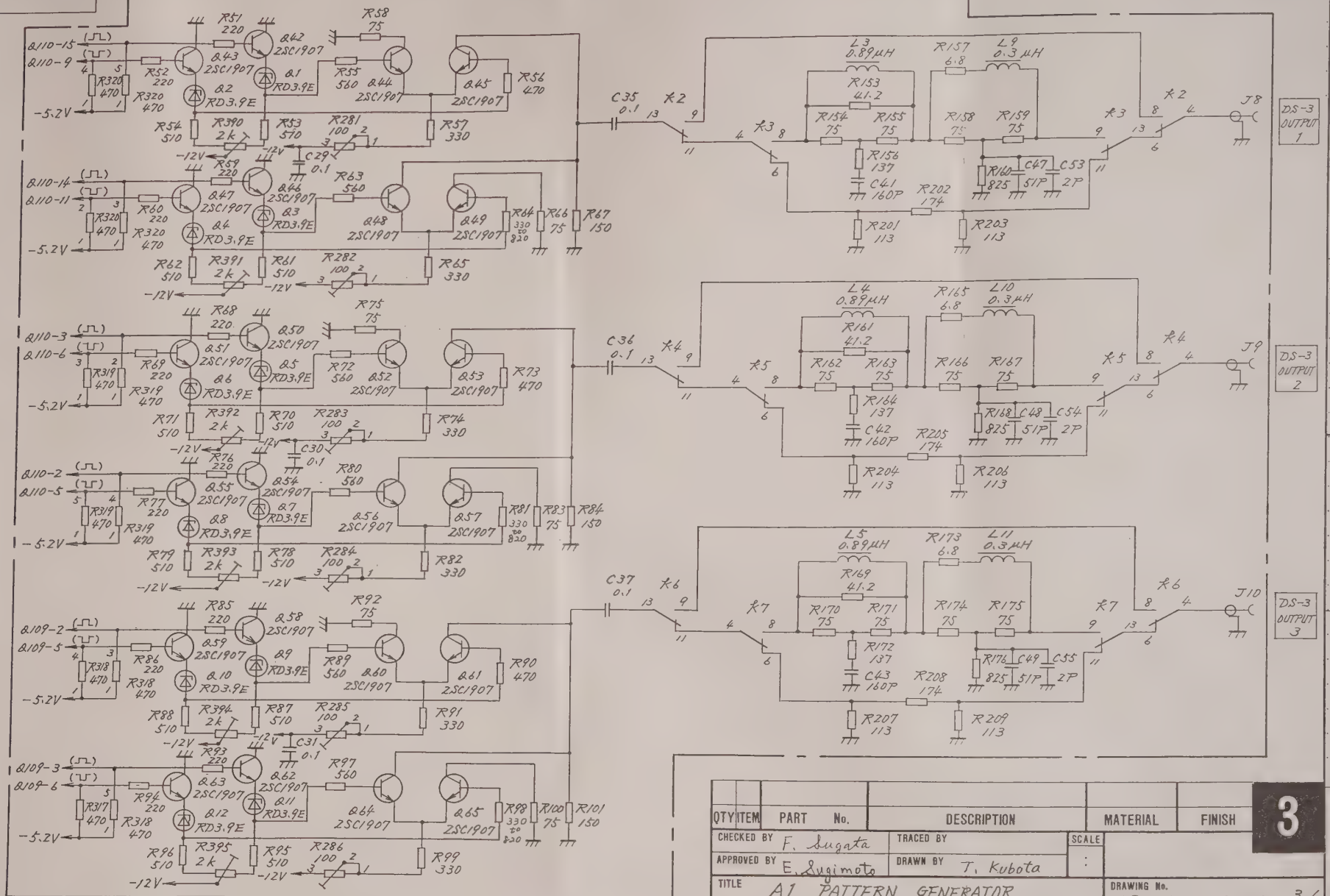
PATTERN (2)
FRAMED:L
D4:L
SINGLE:L
ERROR
ERROR IN
T/R
SIG. SIGNAL
SIGNALING LOGIC
CODE ERROR
ERROR INT/EXT
X-BIT
I/N CLOCK
CLOCK !
ECL DATA
DATA
DATA
ANRITSU CORP
3-65/3-66

APPLICATION

REVISIONS



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QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A1 PATTERN GENERATOR
Circuit Diagram (Transmitter)

DRAWING No. 43W36035 3/6

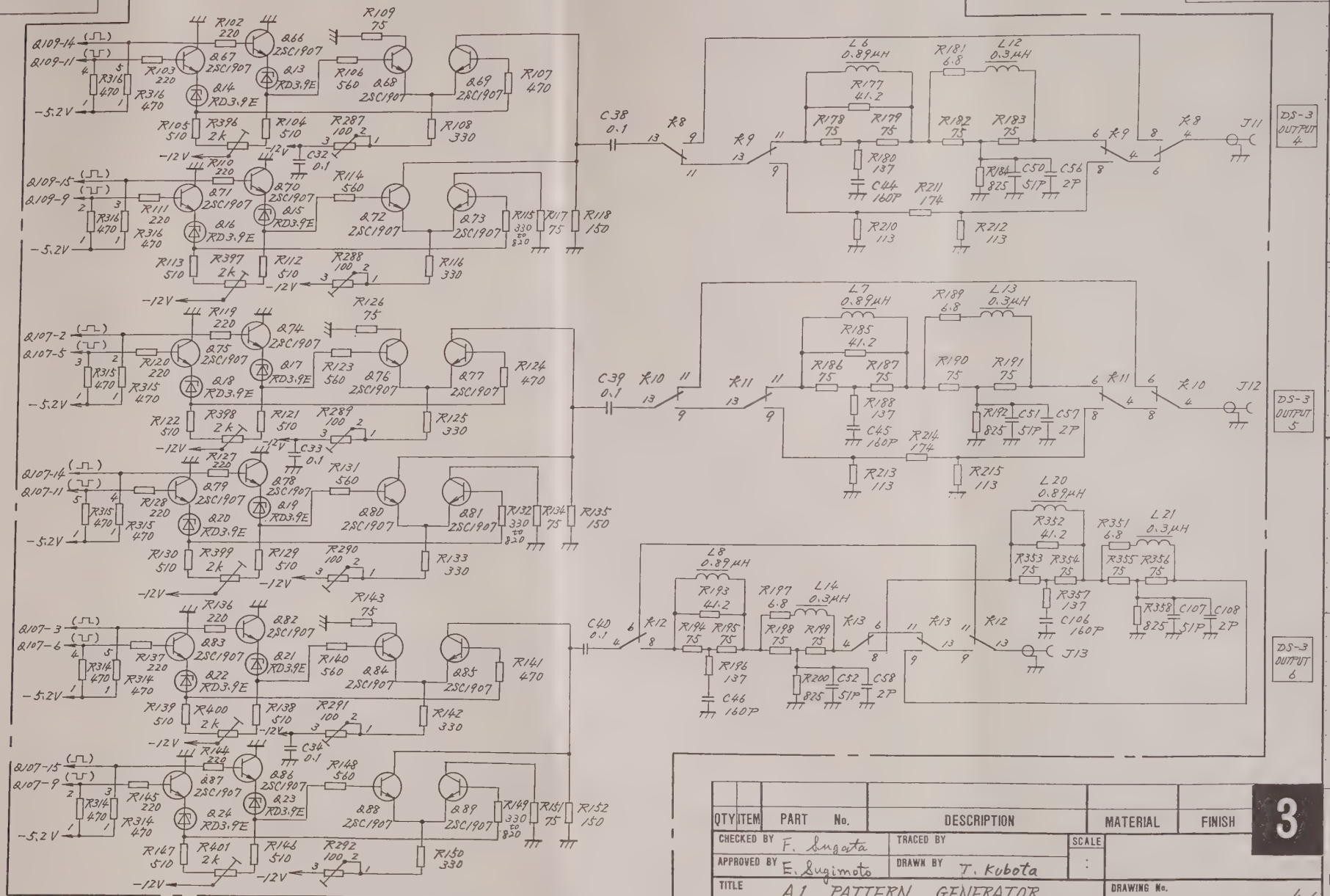
3

ANRITSU CORP.

3-67/3-68

APPLICATION

REVISIONS



DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

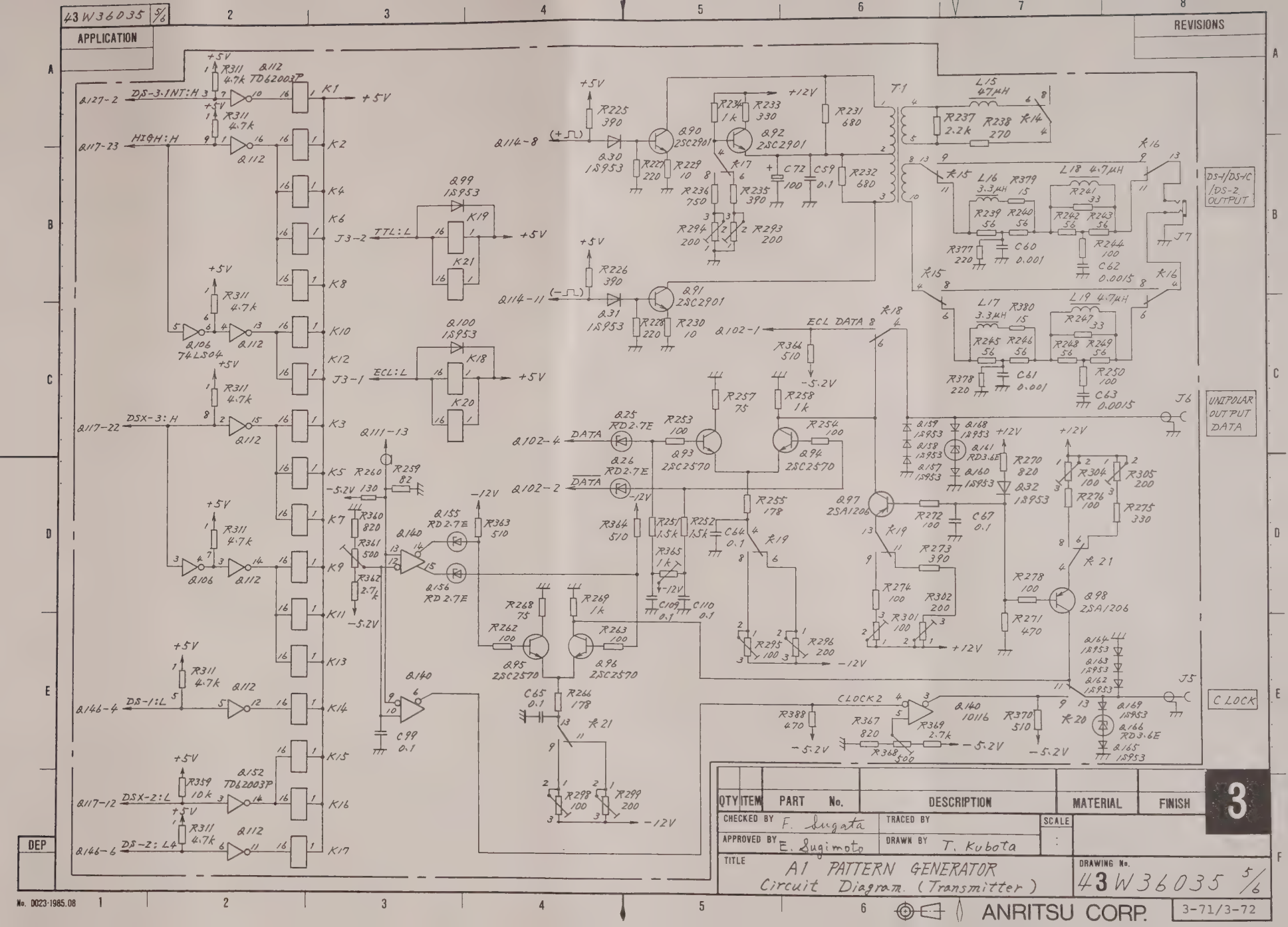
TITLE A1 PATTERN GENERATOR Circuit Diagram (Transmitter)

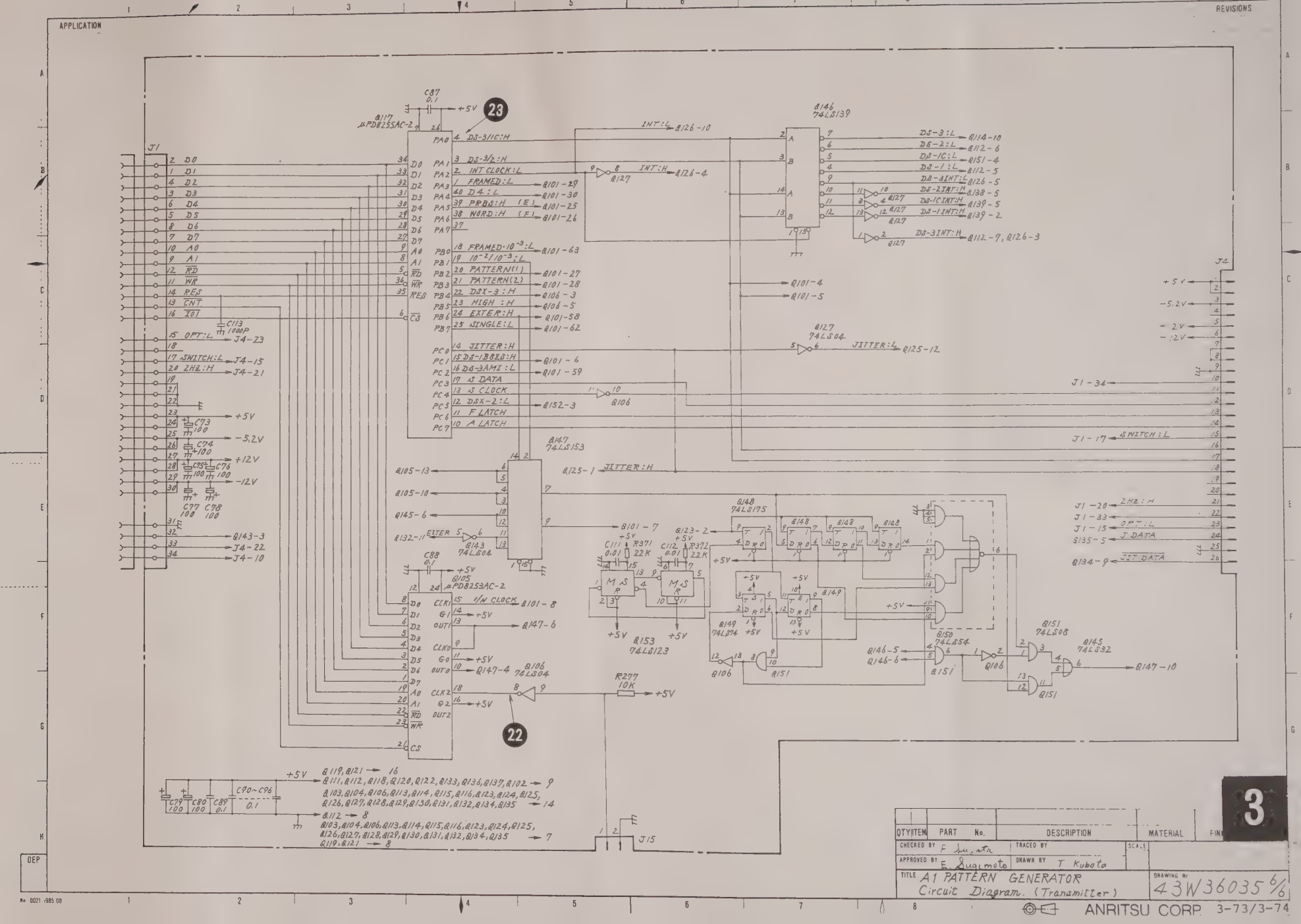
DRAWING No. 43 W36035 4/6

3

ANRITSU CORP.

3-69/3-70


43W36035 5/6
APPLICATION
REVISIONS
DS-1/DS-1C /DS-2 OUTPUT
UNIPOLAR OUTPUT DATA
C LOCK
DS-3:INT:H
HIGH:H
TTL:L
ECL:L
DSX-3:H
DS-1:L
DSX-2:L
DS-2:L4
DATA
CLOCK2
TD62003P
74LS04
IS953
RD2.7E
RD3.6E
2SC2901
2SC2570
2SA1206
10116
DEP
QTY
ITEM
PART No.
DESCRIPTION
MATERIAL
FINISH
CHECKED BY F. Sugata
TRACED BY
SCALE
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota
TITLE
A1 PATTERN GENERATOR
Circuit Diagram. (Transmitter)
DRAWING No.
43W36035 5/6
No. 0023-1985.08
ANRITSU CORP.
3-71/3-72


APPLICATION
REVISIONS
J1
J4
J15
Q117 μPD8255AC-2
Q105 μPD8253AC-2
Q106 74LS04
Q127 74LS04
Q146 74LS139
Q147 74LS153
Q148 74LS175
Q149 74LS374
Q150 74LS54
Q151 74LS08
Q145 74LS32
Q153 74LS123
Q143 74LS04
C87 0.1
C88 0.1
C113 1000P
C73 100
C74 100
C75 100
C76 100
C77 100
C78 100
C79 100
C80 100
C89 0.1
C90~C96
R277 10K
R371 22K
R372 22K
+5V
-5.2V
+12V
-12V
INT:L
INT:H
JITTER:L
JITTER:H
SWITCH:L
2HZ:H
OPT:L
EXTER S
1/N CLOCK
DS-3/C:H
DS-3/2:H
INT CLOCK:L
FRAMED:L
D4:L
PRBS:H (E)
WORD:H (F)
FRAMED·10⁻³:L
10⁻²/10⁻³:L
PATTERN(1)
PATTERN(2)
DSX-3:H
HIGH:H
EXTER:H
SINGLE:L
DS-1BBES:H
DS-3AMI:L
IS DATA
IS CLOCK
DSX-2:L
F LATCH
A LATCH
DS-3:L
DS-2:L
DS-1C:L
DS-1:L
DS-3INT:L
DS-2INT:H
DS-1CINT:H
DS-1INT:H
DS-3INT:H
J1-34
J1-17
J1-20
J1-33
J1-15
S135-5
S134-9
J-DATA
J-CLK
Q119,Q121 → 16
Q111,Q112,Q118,Q120,Q122,Q133,Q134,Q137,Q102 → 9
Q103,Q104,Q106,Q113,Q114,Q115,Q116,Q123,Q124,Q125,Q126,Q127,Q128,Q129,Q130,Q131,Q132,Q134,Q135 → 14
Q112 → 8
Q103,Q104,Q106,Q113,Q114,Q115,Q116,Q123,Q124,Q125,Q126,Q127,Q128,Q129,Q130,Q131,Q132,Q134,Q135 → 7
Q119,Q121 → 8
DEP
QTY/ITEM
PART No.
DESCRIPTION
MATERIAL
FINISH
CHECKED BY F Sugata
TRACED BY
APPROVED BY E Sugimoto
DRAWN BY T Kubota
SCALE
TITLE A1 PATTERN GENERATOR Circuit Diagram. (Transmitter)
DRAWING No. 43W36035 6/6
ANRITSU CORP. 3-73/3-74

3.5.4 A3 T-DISPLAY PC board 4

(1) Circuit Description

Table A3 T-DISPLAY circuit consists of a detection circuit of the front-panel switching status, and a driver circuit for the LEDs and the digital display.

(2) Troubleshoot and adjustment

[Step 1]

Check the waveforms at ❶ using an oscilloscope.

The waveform shown in Fig. 3-45 is normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to Q1.

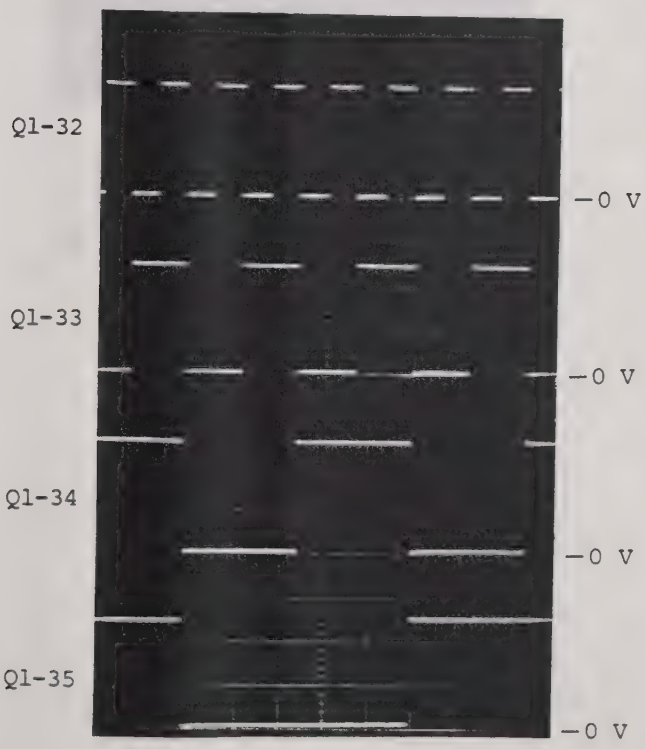


Fig. 3-45 Waveforms at ❶

[Step 2]

Check the waveform at ❷ using an oscilloscope probe when the [CLOCK] key is pressed.

The waveform shown in Fig. 3-46 is normal.

If it is normal, A3 is normal.

If it is abnormal, troubleshoot the circuits related to Q1 and S4.

Fig. 3-46 Waveform at ❷

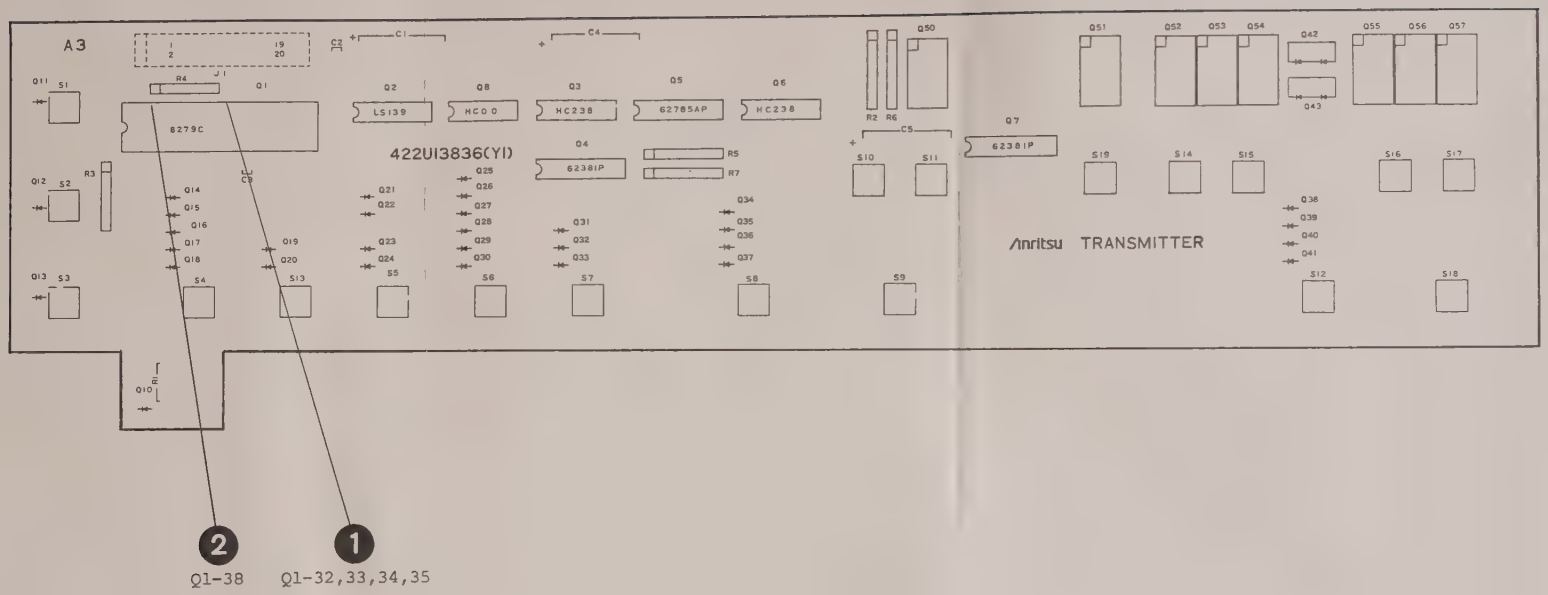
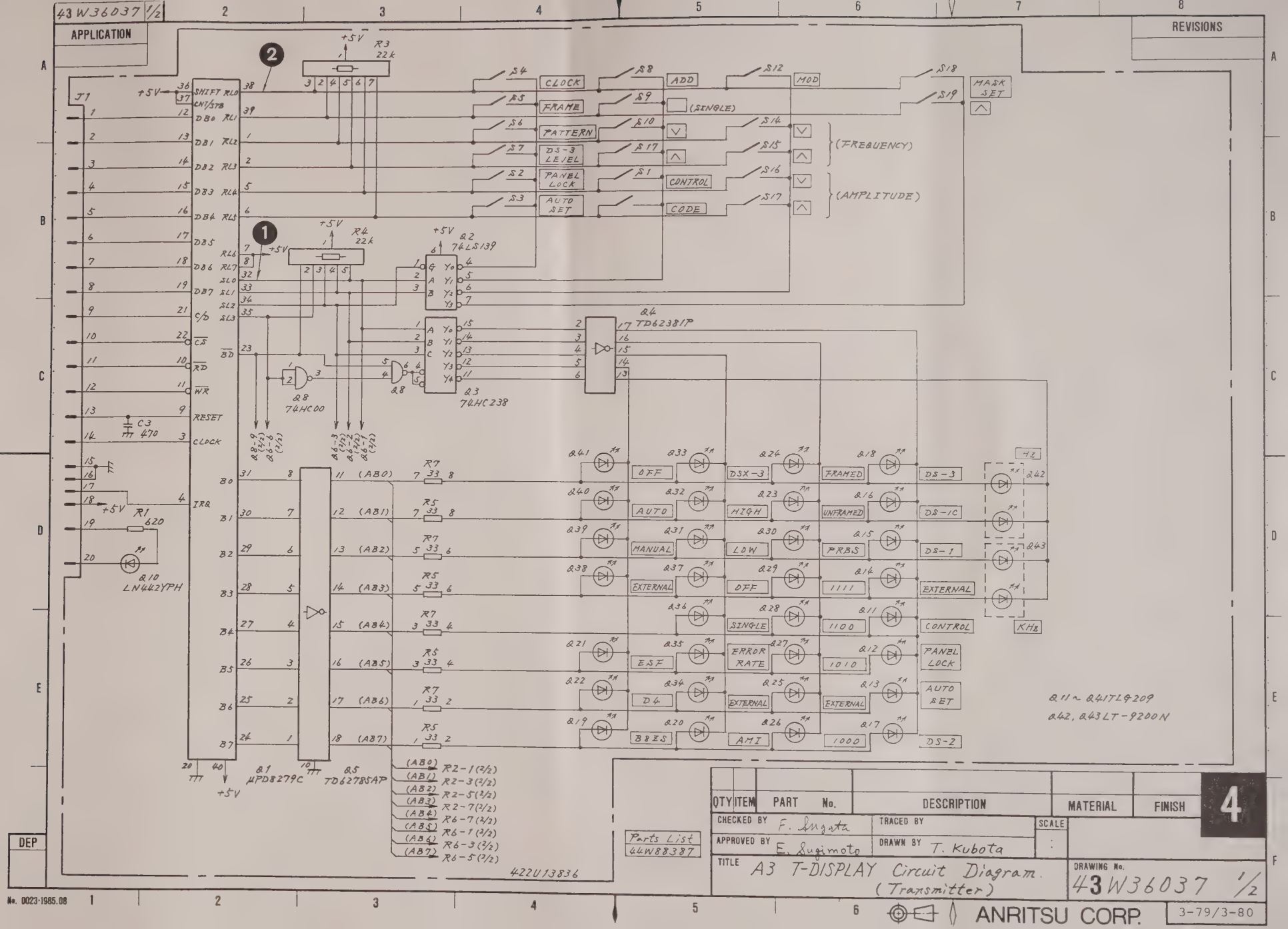


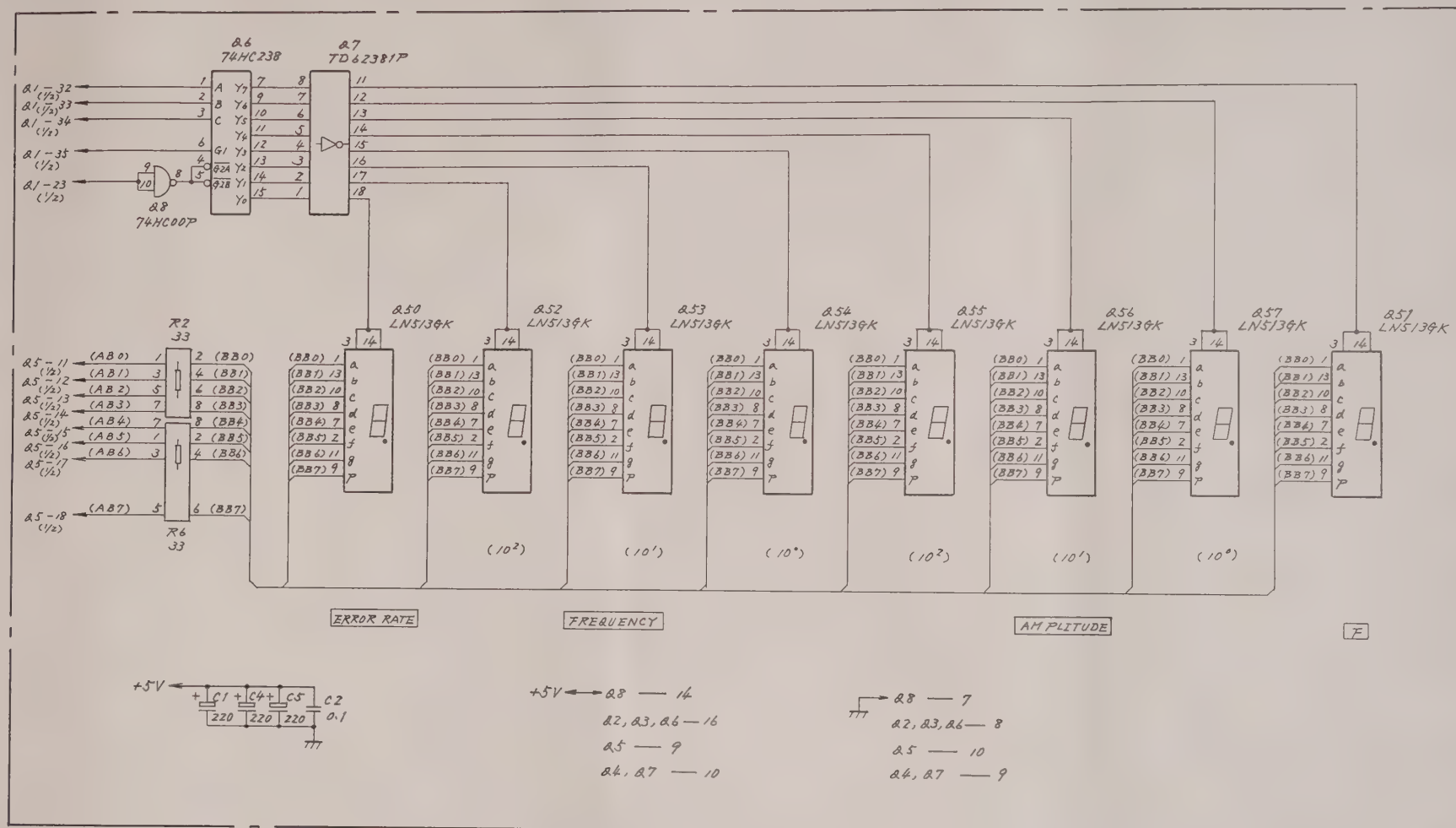
Fig. 3-47 T-DISPLAY PC Board 4
Parts Layout

(3-77 blank)/3-78


43W36037 1/2
APPLICATION
REVISIONS
J1
SHIFT RLO
LNI/STB
DB0 RL1
DB1 RL2
DB2 RL3
DB3 RL4
DB4 RL5
DB5
DB6 RL7
DB7 SL0
SL1
SL2
SL3
C/D
CS
RD
WR
RESET
CLOCK
IRQ
BD
+5V
R1 620
C3 470
Q10 LN442YPH
R3 22k
R4 22k
Q2 74LS139
Q3 74HC238
Q4 TD62381P
Q8 74HC00
S4 CLOCK
S5 FRAME
S6 PATTERN
S7 DS-3 LEVEL
S2 PANEL LOCK
S3 AUTO SET
S8 ADD
S9 (SINGLE)
S10
S1 CONTROL
CODE
S12 MOD
S14
S15 (FREQUENCY)
S16
S17 (AMPLITUDE)
S18 MASK SET
S19
Q41 OFF
Q40 AUTO
Q39 MANUAL
Q38 EXTERNAL
Q21 ESF
Q22 D4
Q19 B8ZS
Q33 DSX-3
Q32 HIGH
Q31 LOW
Q37 OFF
Q36 SINGLE
Q35 ERROR RATE
Q34 EXTERNAL
Q20 AMI
Q24 FRAMED
Q23 UNFRAMED
Q30 PRBS
Q29 1111
Q28 1100
Q27 1010
Q25 EXTERNAL
Q26 1000
Q18 DS-3
Q16 DS-1C
Q15 DS-1
Q14 EXTERNAL
Q11 CONTROL
Q12 PANEL LOCK
Q13 AUTO SET
Q17 DS-2
Hz
KHz
Q42
Q43
Q11 ~ Q41 TL9209
Q42, Q43 LT-9200N
Q1 μPD8279C
Q5 TD62785AP
(AB0) R2-1(2/2)
(AB1) R2-3(2/2)
(AB2) R2-5(2/2)
(AB3) R2-7(2/2)
(AB4) R6-7(2/2)
(AB5) R6-1(2/2)
(AB6) R6-3(2/2)
(AB7) R6-5(2/2)
422U13836
Parts List 44W88387
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY F. Sugata
APPROVED BY E. Sugimoto
TRACED BY
DRAWN BY T. Kubota
SCALE
TITLE A3 T-DISPLAY Circuit Diagram. (Transmitter)
DRAWING No. 43W36037 1/2
DEP
No. 0023-1985.08
ANRITSU CORP.
3-79/3-80

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A3 T-DISPLAY Circuit Diagram. (Transmitter)

DRAWING No. 43W36037 2/2

DEP

4

No. 0023-1985.08

ANRITSU CORP.

3-81/3-82

3.5.5 A4 JITTER MODULATION PC board 5 (OPT 01)

(1) Circuit description

Figure 3-49 is the block diagram of this circuit.

The A4 JITTER MODULATION circuit consists of a frequency divider PD (phase-detection) circuit, LPF circuit, VCO circuit, jitter counting circuit, and external data input circuit. The frequency-division circuit divides the clock signal by 10 for DS-3, and by 6 for DS-2/1C/1. The PD circuit detects the phase difference between the reference clock signal and the jitter-modulated clock signal.

The LPF circuit removes the jitter modulation signal.

The VCO circuit generates the jitter-modulated clock signal. The counting circuit detects the jitter and sends a pulse to the A2 T-CONTROL circuit to display the amount of jitter.

The jitter addition circuit adds jitter to the external data signal.

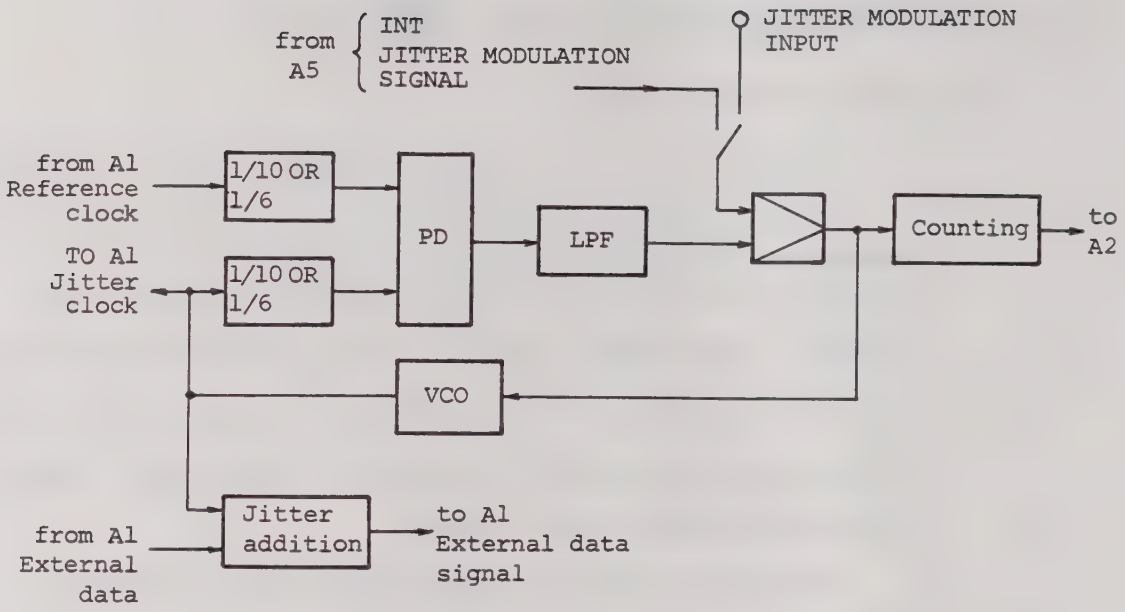


Fig. 3-48 A4 JITTER MODULATION Block Diagram

(2) Troubleshooting and adjustment

Panel setting

CLOCK	:	DS-3
JITTER MODULATION	:	MANUAL
FREQUENCY	:	500 Hz
AMPLITUDE	:	4 UIp-p

[Step 1]

Check the waveforms at ❶ using an oscilloscope probe.

The waveforms shown in Fig. 3-49 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❶.

Fig. 3-49 Waveforms at ❶

[Step 2]

Check the waveforms at ❷, ❸ and ❹ using an oscilloscope.

The waveforms shown in Fig. 3-50 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❶ to ❷, and ❶ to ❸ and ❹.

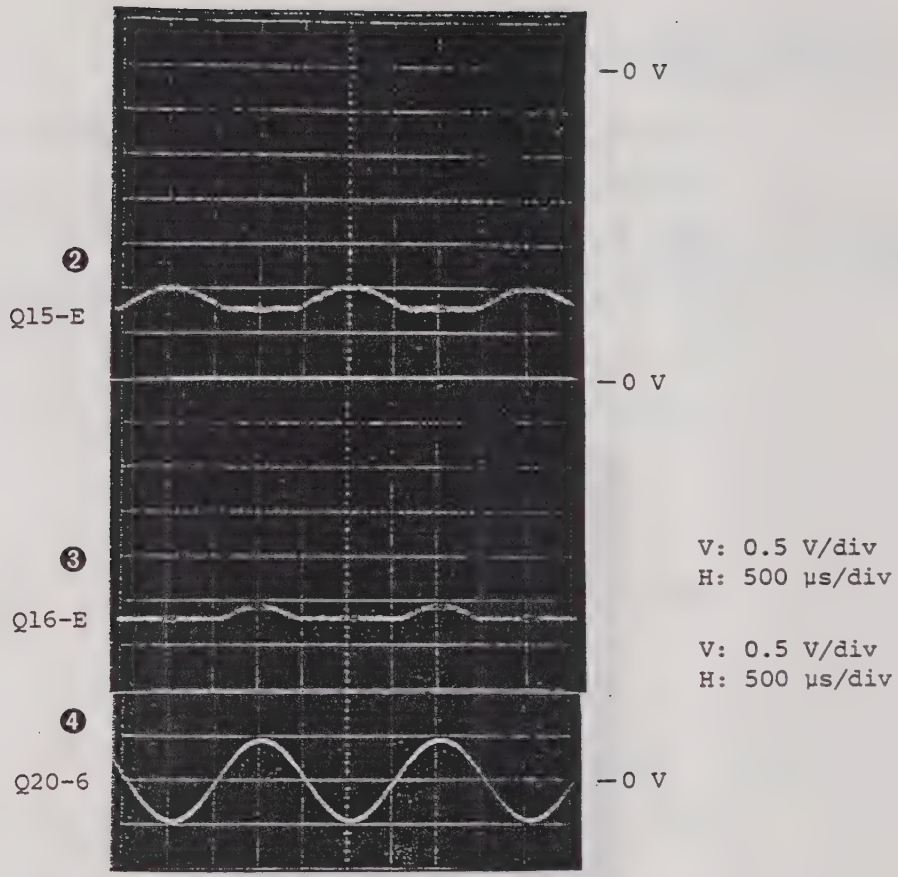


Fig. 3-50 Waveforms at ❷ , ❸ and ❹

[Step 3]

Check the waveform at ❺ using an oscilloscope.

The waveform shown in Fig. 3-51 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R60, R61, R62, or R63 so that the waveform at ❺ is as shown in Fig. 3-51.

CLOCK	DUTY
DS-3	R60
DS-2	R61
DS-1C	R62
DS-1	R63

If it is abnormal after the above adjustment has been made, troubleshoot the circuits related ❹ and ❺.

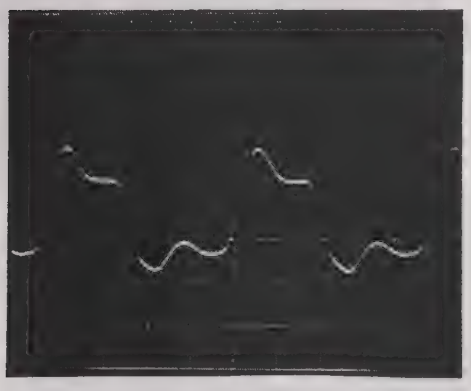


Fig. 3-51 Waveform at ❺

[Step 4]

Check the waveform at ❻ using an oscilloscope. The waveform shown in Fig. 3-52 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the level at R78.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J8-1 to ❻.

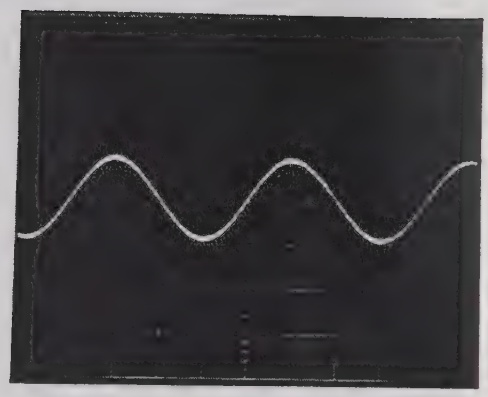


Fig. 3-52 Waveform at ❻

[Step 5]

Check the waveform at ❼ using an oscilloscope probe. The waveform shown in Fig. 3-53 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❼.

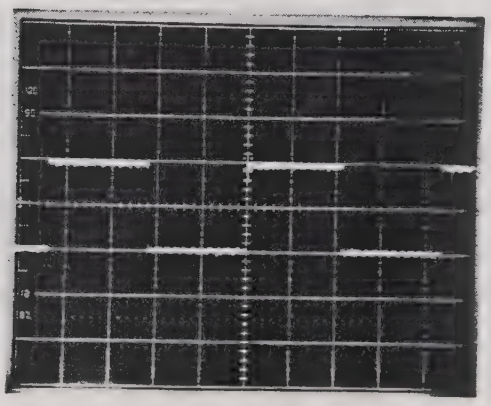


Fig. 3-53 Waveform at ❼

[Step 6]

Check the waveform at ❽ using an oscilloscope.

The waveform shown in Fig. 3-54 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to Q32 to ❽.

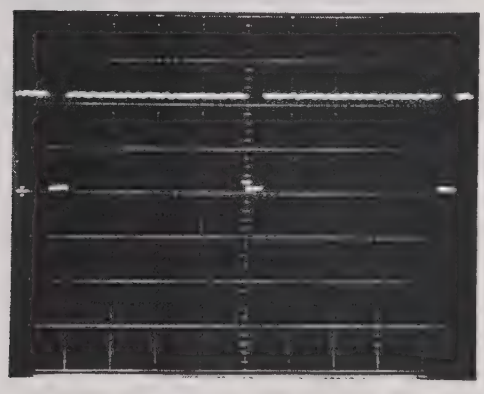


Fig. 3-54 Waveform at ❽

[Step 7]

Set-up as shown in Fig. 3-41. Set the panel as described in paragraph 3.5.3. (2) (i).

Check the waveform at ❾ using an oscilloscope probe.

The waveform shown in Fig. 3-55 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to J1-24 to ❾.

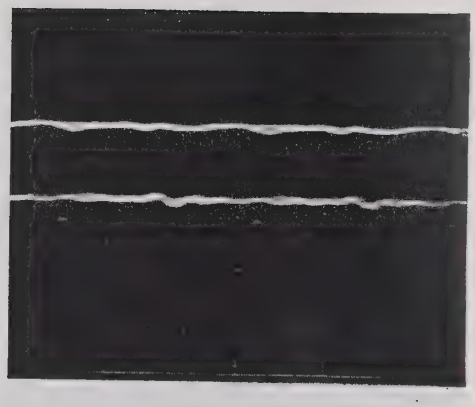


Fig. 3-55 Waveform at ❾

[Step 8]

Check the waveform at ❿ using an oscilloscope.

The waveform shown in Fig. 3-56 is normal.
If it is normal, A4 is normal.

If it is abnormal, troubleshoot the circuits related to ❾ to ❿.

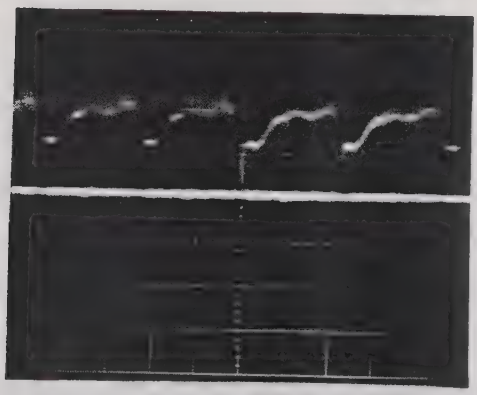


Fig. 3-56 Waveform at ❿

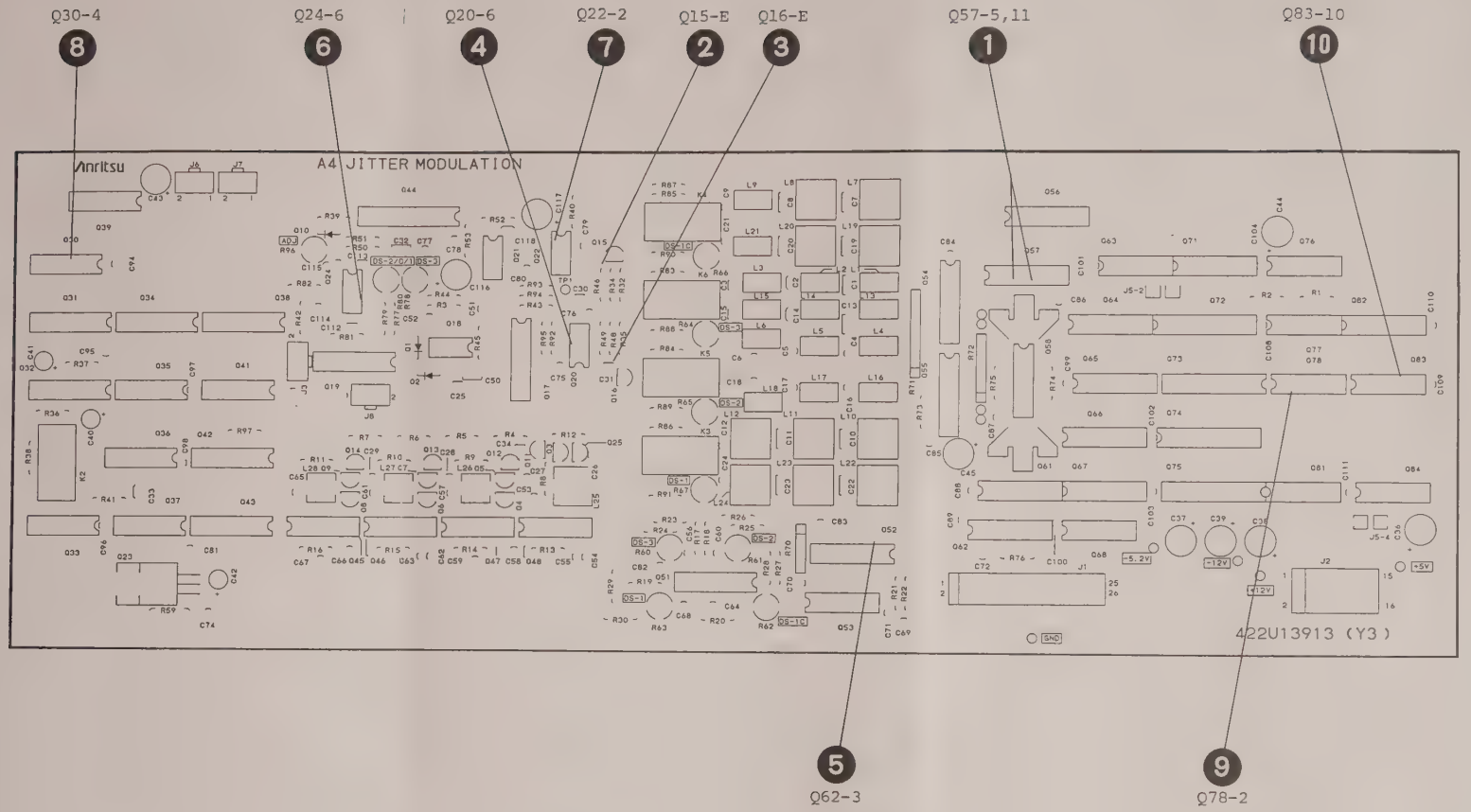
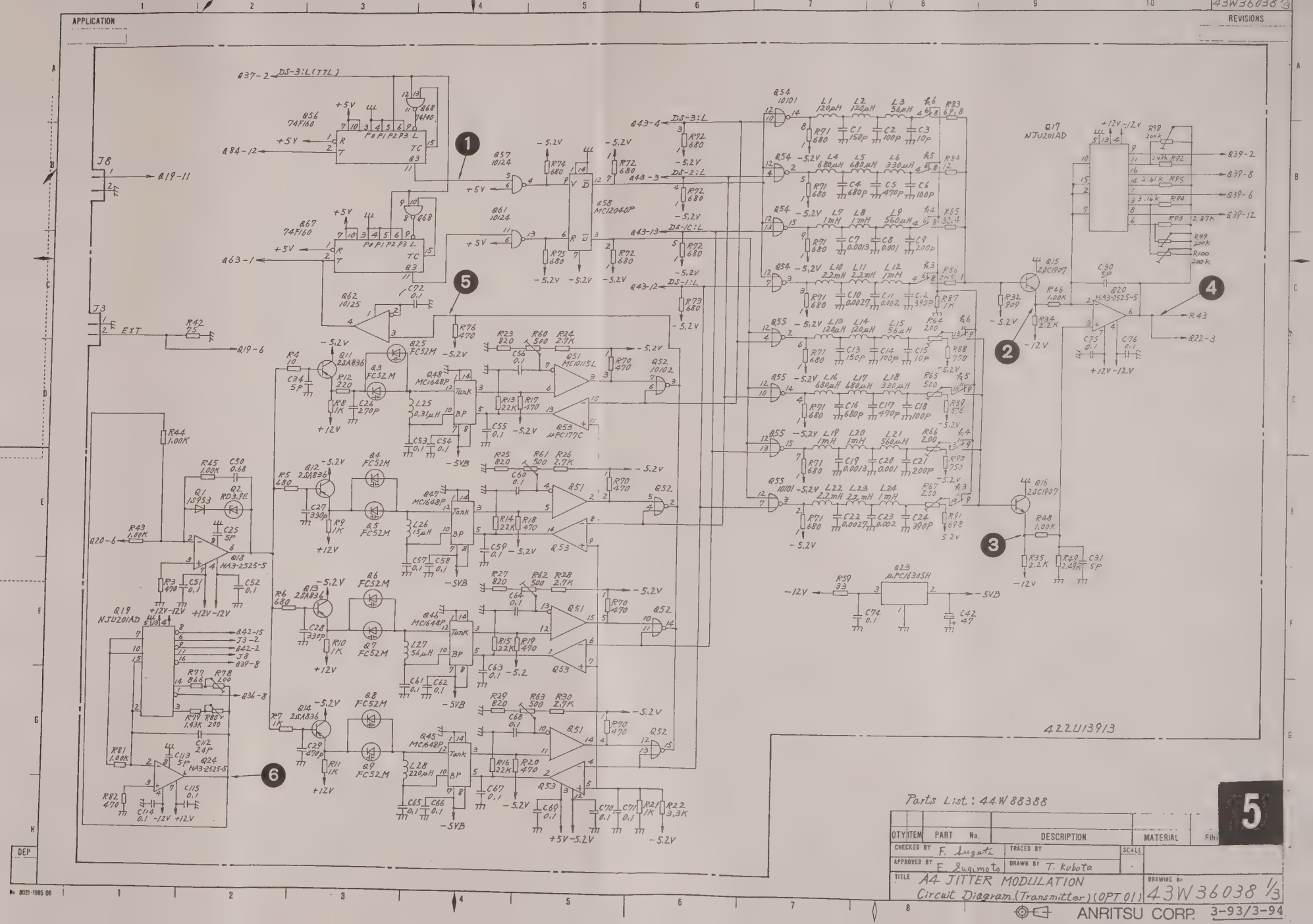
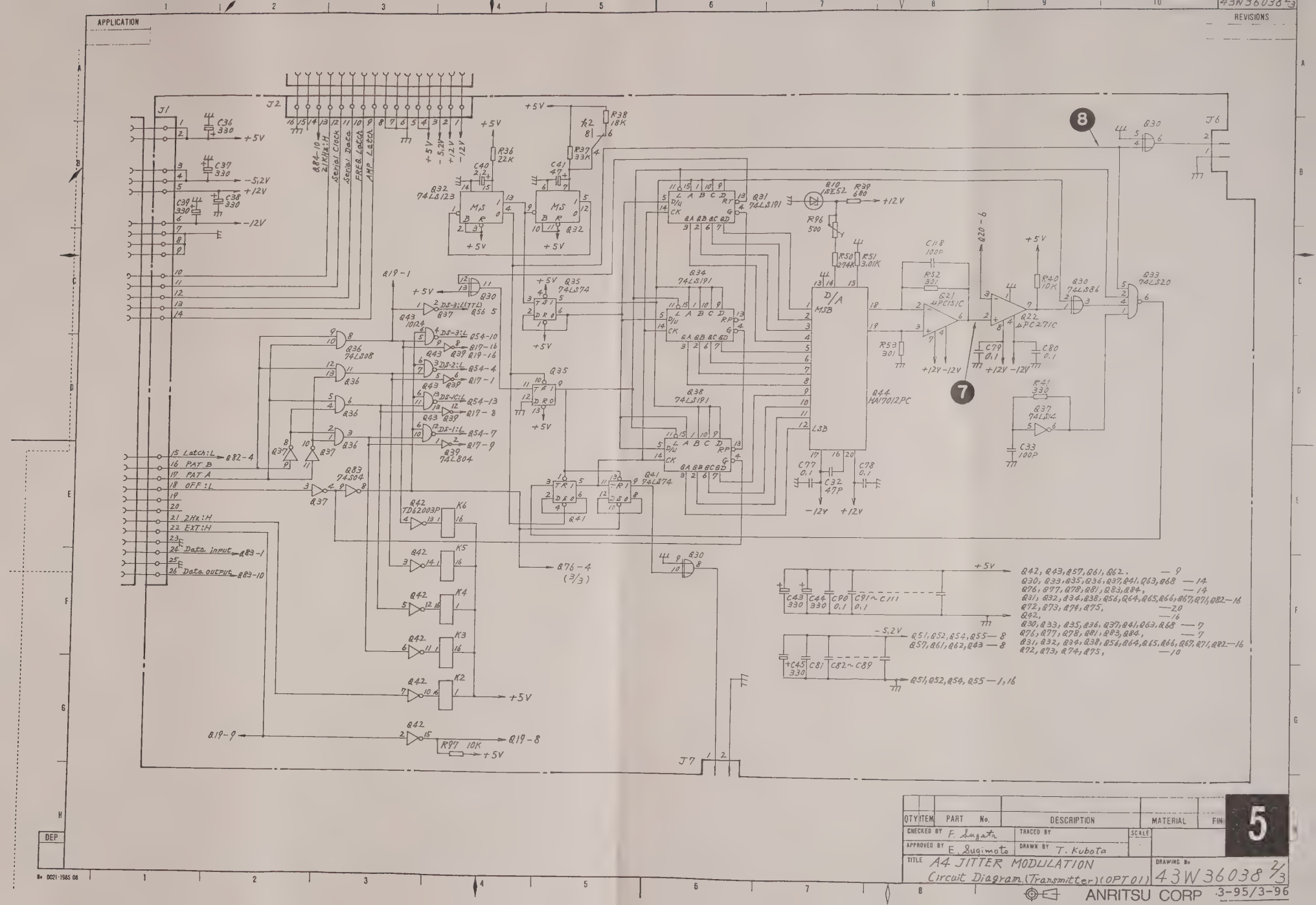


Fig. 3-57 JITTER MODULATION
PC Board 5
Parts Layout

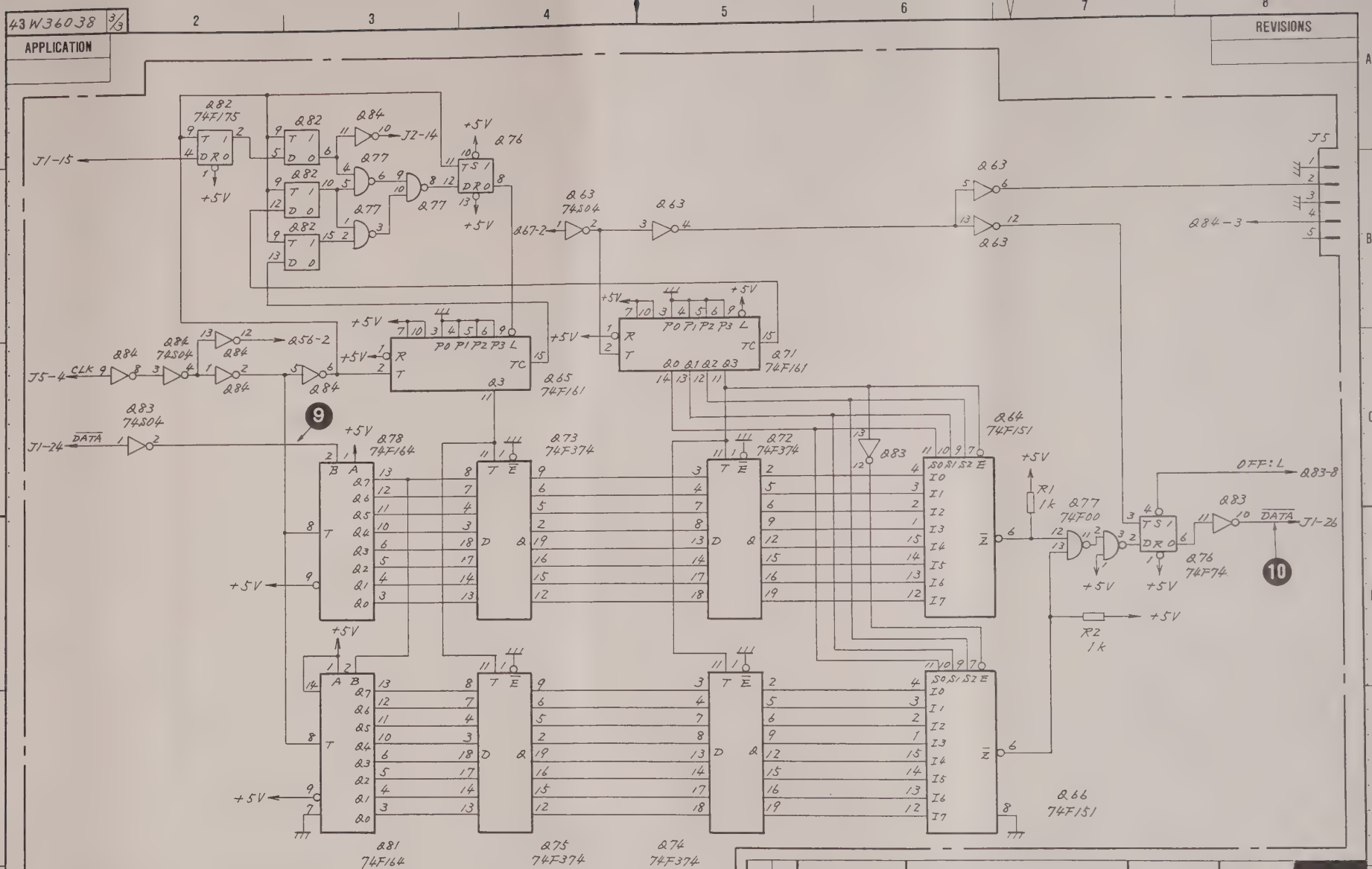
(3-91 blank)/3-92


APPLICATION
REVISIONS
43W36038 3/3
DS-3:L(TTL)
DS-3:L
DS-2:L
DS-1C:L
DS-1:L
74F160
74F00
MC12040P
MC1115L
MC1648P
HA3-2525-5
NJU201AD
μPC1177C
μPC1330SH
2SA836
2SC1907
FC52M
RD3.9E
1S953
EXT
Parts List: 44W88388
A4 JITTER MODULATION
Circuit Diagram.(Transmitter)(OPT01)
DRAWING No 43W36038 1/3
ANRITSU CORP.
3-93/3-94
F. Sugata
E. Sugimoto
T. kubota
5


APPLICATION
REVISIONS
J1
J2
J6
J7
+5V
-5.2V
+12V
-12V
Serial Clock
Serial Data
FREQ Latch
AMP Latch
15 Latch:L
16 PAT B
17 PAT A
18 OFF:L
21 2Hz:H
22 EXT:H
24 Data input
26 Data output
Q32 74LS123
Q31 74LS191
Q34 74LS191
Q38 74LS191
Q41 74LS74
Q35 74LS74
Q36 74LS08
Q37 74L804
Q83 74S04
Q42 TD62003P
Q44 HA7012PC
Q21 μPC151C
Q22 μPC271C
Q33 74LS20
Q30 74LS86
Q37 74LS14
D/A
MSB
LSB
K6
K5
K4
K3
K2
R97 10K
Q19-9
Q19-8
Q76-4 (3/3)
Q82-4
Q83-1
Q83-10
Q54-10
Q17-16
Q19-16
Q54-4
Q17-1
Q54-13
Q17-8
Q54-7
Q17-9
Q20-6
8
7
Q42, Q43, Q57, Q61, Q62. — 9
Q30, Q33, Q35, Q36, Q37, Q41, Q63, Q68 — 14
Q76, Q77, Q78, Q81, Q83, Q84, — 14
Q31, Q32, Q34, Q38, Q56, Q64, Q65, Q66, Q67, Q71, Q82—16
Q72, Q73, Q74, Q75, —20
Q92, —16
Q30, Q33, Q35, Q36, Q37, Q41, Q63, Q68 — 7
Q76, Q77, Q78, Q81, Q83, Q84, — 7
Q31, Q32, Q34, Q38, Q56, Q64, Q65, Q66, Q67, Q71, Q82—16
Q72, Q73, Q74, Q75, —10
+5V
-5.2V
Q51, Q52, Q54, Q55 — 8
Q57, Q61, Q62, Q43 — 8
Q51, Q52, Q54, Q55 — 1, 16
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FIN
CHECKED BY F. Sugata
TRACED BY
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota
SCALE
TITLE A4 JITTER MODULATION Circuit Diagram (Transmitter) (OPT 01)
DRAWING No 43W36038 2/3
5
ANRITSU CORP
3-95/3-96

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE : M-1

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A4 JITTER MODULATION Circuit Diagram. (Transmitter) (OPT 01)

DRAWING No. 43W36038 3/3

DEP

5

No. D023-1985.08

ANRITSU CORP.

3-97/3-98

3.5.6 A5 MODULATION SIGNAL GENERATOR 6

(1) Circuit description

The A5 MODULATION SIGNAL GENERATOR circuit consists of a jitter modulation oscillation circuit and level variable D/A converter and generates the jitter modulation signals (2 Hz to 300 kHz sine wave).

(2) Troubleshooting and adjustment

Panel setting

CLOCK	:	DS-3
JITTER MODULATION	:	MANUAL
FREQUENCY	:	500 Hz
AMPLITUDE	:	4 UIp-p

[Step 1]

Check the waveform at ❶ using an oscilloscope.

The waveform shown in Fig. 3-58 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Z1 to ❶.

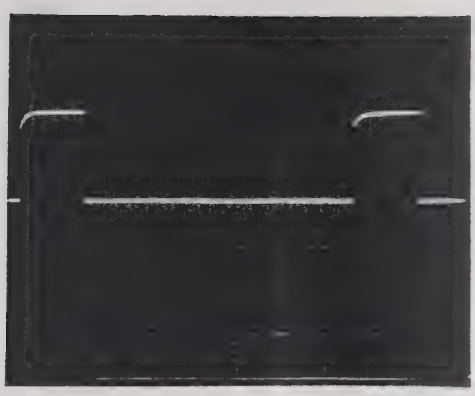


Fig. 3-58 Waveform at ❶

[Step 2]

Check the waveform at ❷ using an oscilloscope.

The waveform shown in Fig. 3-59 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❷ .

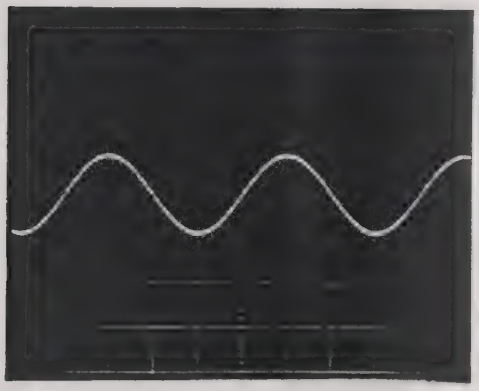


Fig. 3-59 Waveform at ❷

[Step 3]

Check the waveform at ❸ using an oscilloscope.

The waveform shown in Fig. 3-60 is normal.

If it is normal, A4 is normal. If it is abnormal, make the following adjustment.

Adjustment

Adjust the level at R3.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to ❷ to ❸.

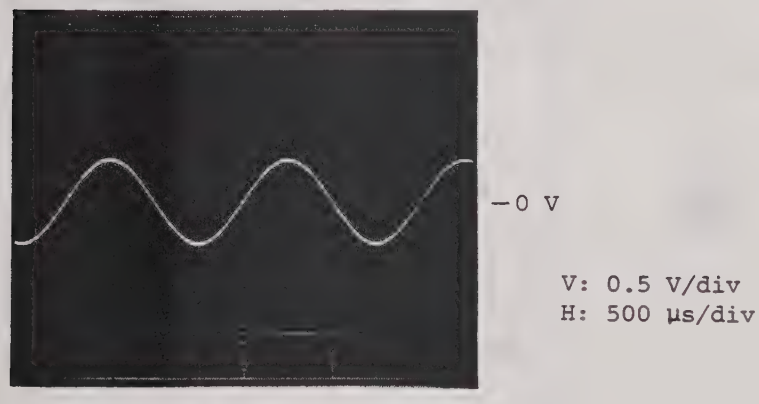


Fig. 3-60 Waveform at ❸

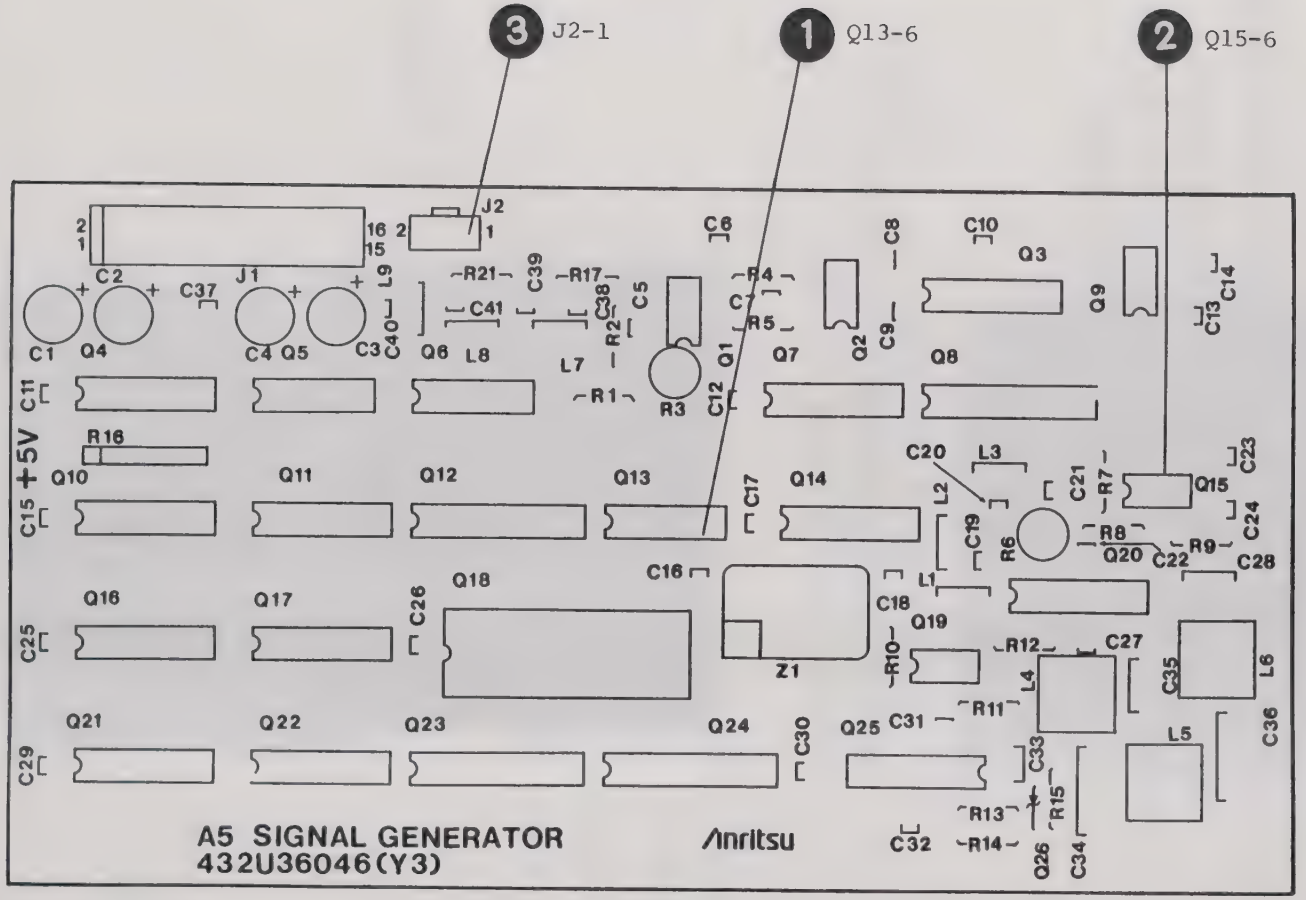
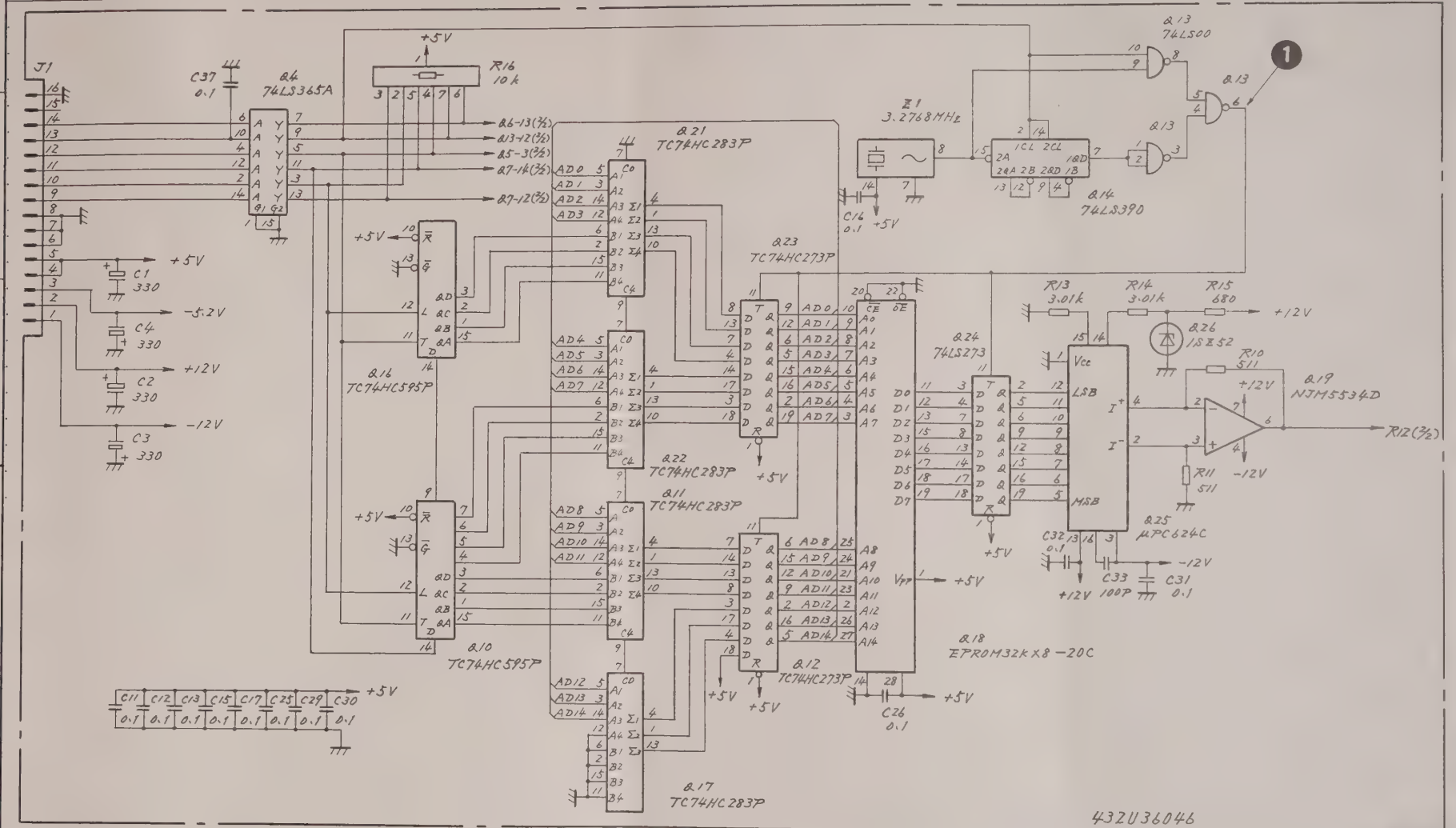


Fig. 3-61 MODULATION SIGNAL GENERATOR
PC Board 6 Parts Layout

APPLICATION

REVISIONS



43ZU36046

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F Sugata	TRACED BY	SCALE	6
APPROVED BY E. Sugimoto	DRAWN BY T. Kubota	:	

TITLE A5 MODULATION SIGNAL GENERATOR Circuit Diagram. (Transmitter)(OPT 01)

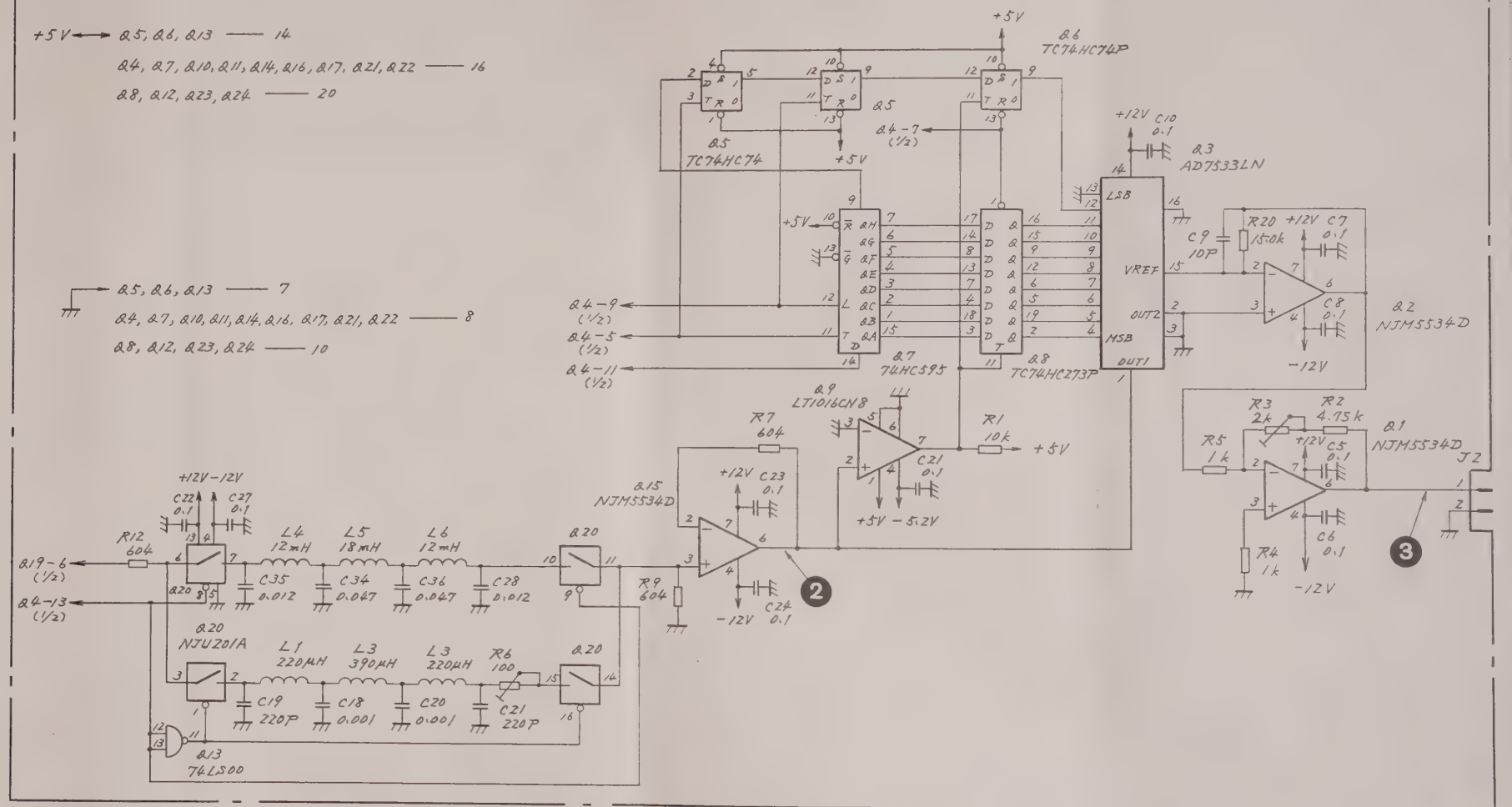
DRAWING No. 43W36048 1/2

Parts List 44W88408

DEP

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

M-2

TITLE A5 MODULATION SIGNAL GENERATOR
Circuit Diagram (Transmitter) (OPT 01)

DRAWING No. 43W36048 2/2

DEP

3.5.7 A6 T-SWITCH PC Board 7.

A7 GP-IB PC Board 8 and

A8 RS-232C PC Board 9

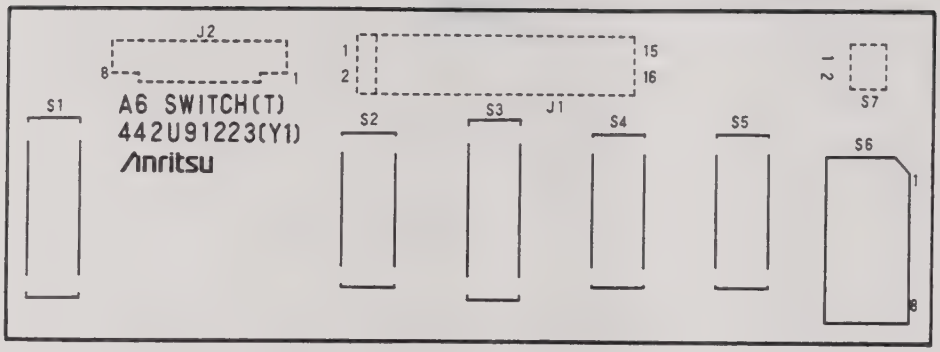
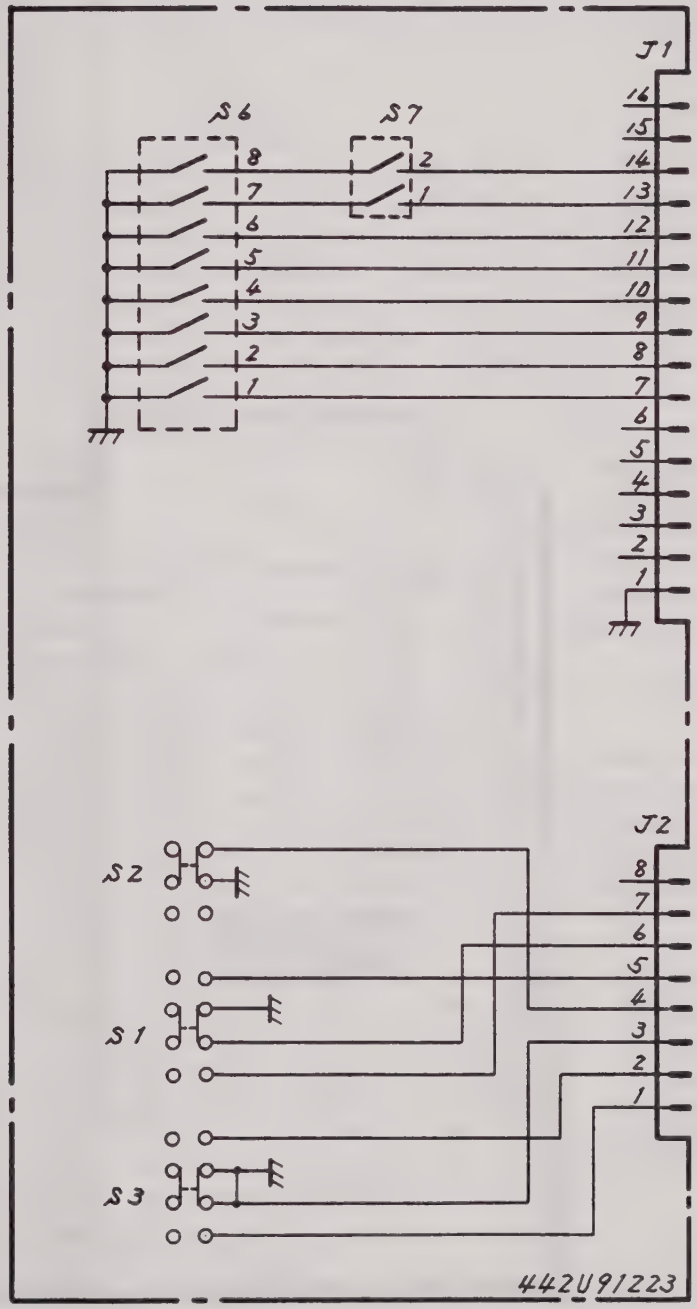


Fig. 3-62 T-SWITCH PC Board 7 Parts Layout

APPLICATION	REVISIONS



Parts List 44W90993

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

7

CHECKED BY F. Sugata	TRACED BY	SCALE :	
APPROVED BY E. Sugimoto	DRAWN BY T. Kubota		
DEP	TITLE A6 T-SWITCH Circuit Diagram (Transmitter)	DRAWING No. 44W90992 1/1	

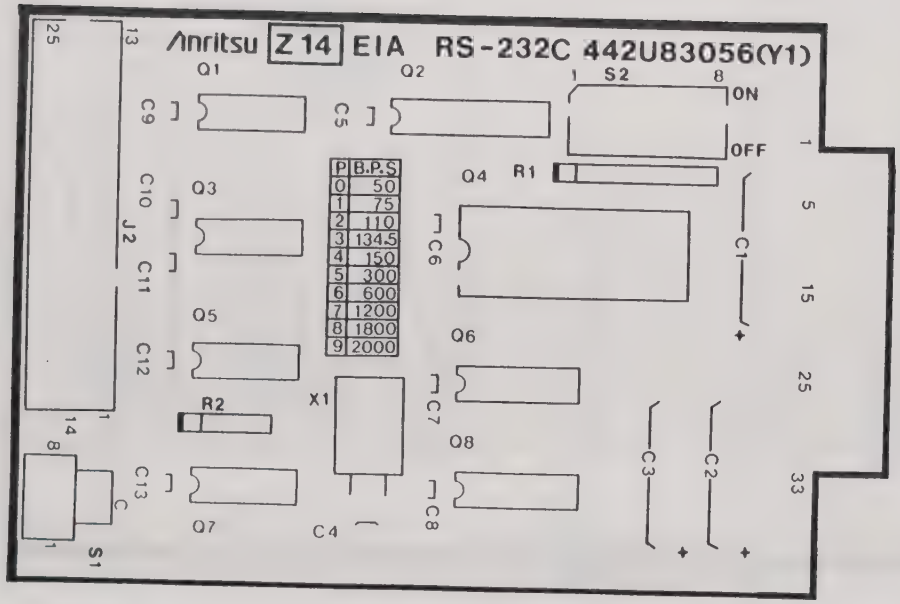
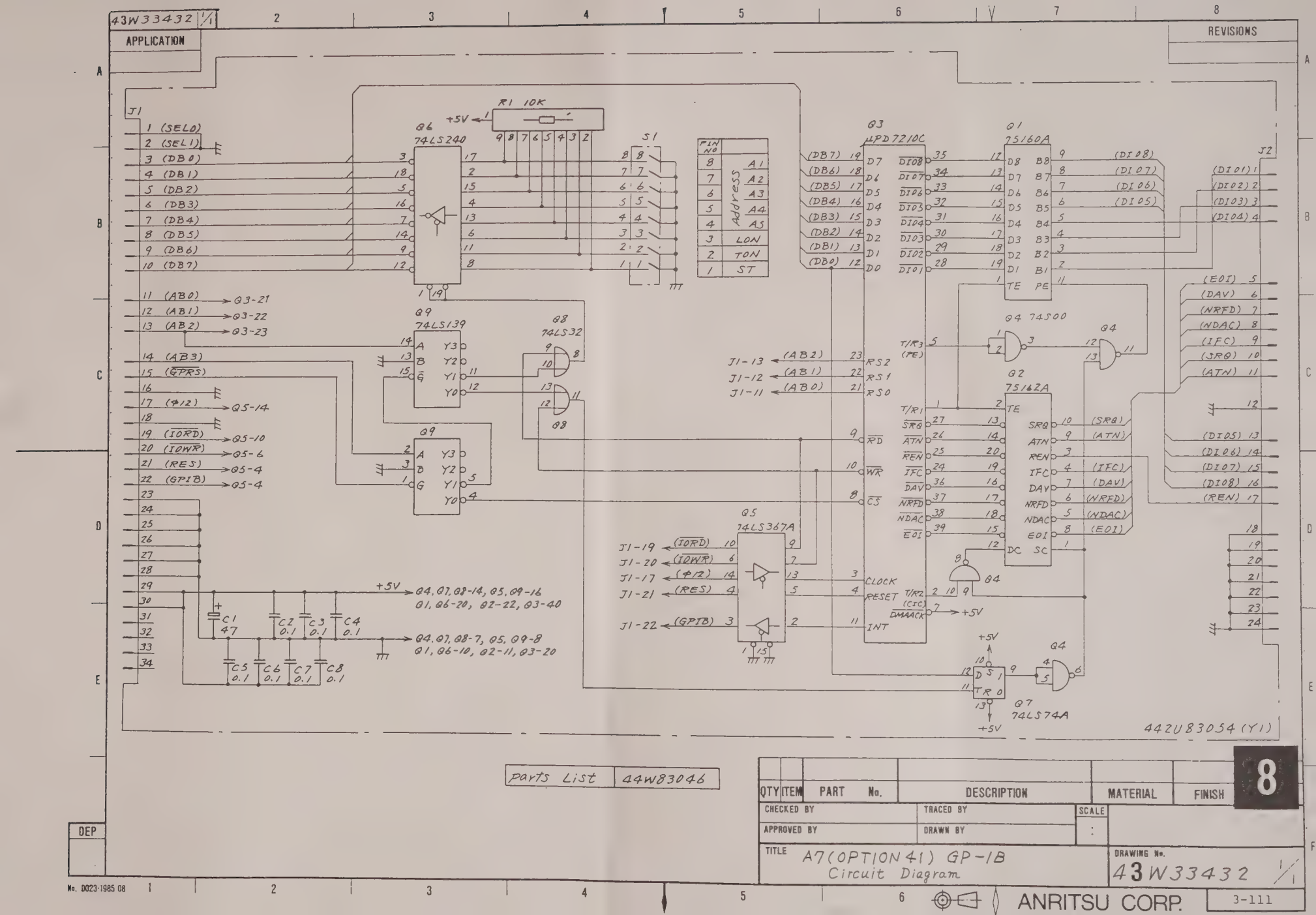


Fig. 3-63 GP-IB PC Board 8 Parts Layout



parts List	44W83046

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY	TRACED BY	SCALE :
APPROVED BY	DRAWN BY	

TITLE A7(OPTION41) GP-IB
Circuit Diagram

DRAWING No. 43W33432 1/1

8

DEP

No. D023-1985 08

ANRITSU CORP.

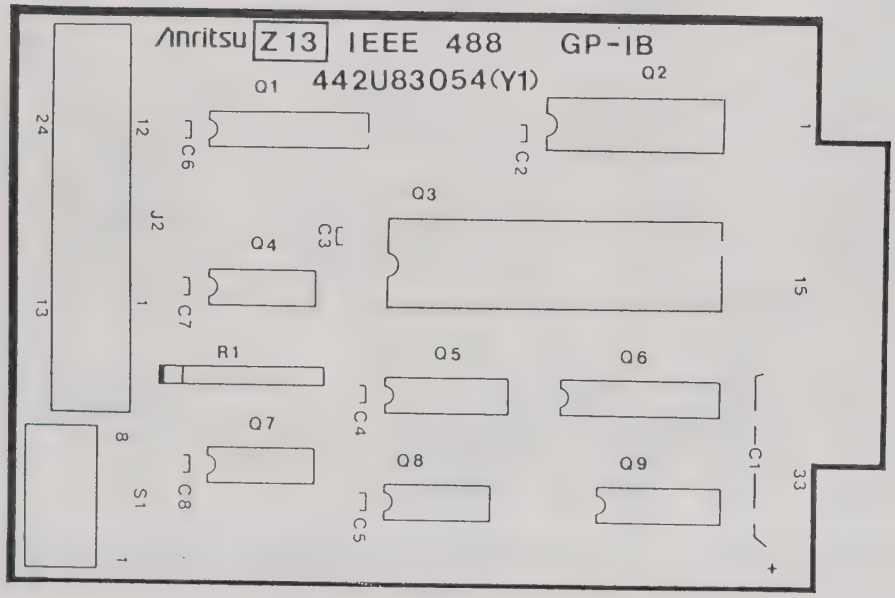
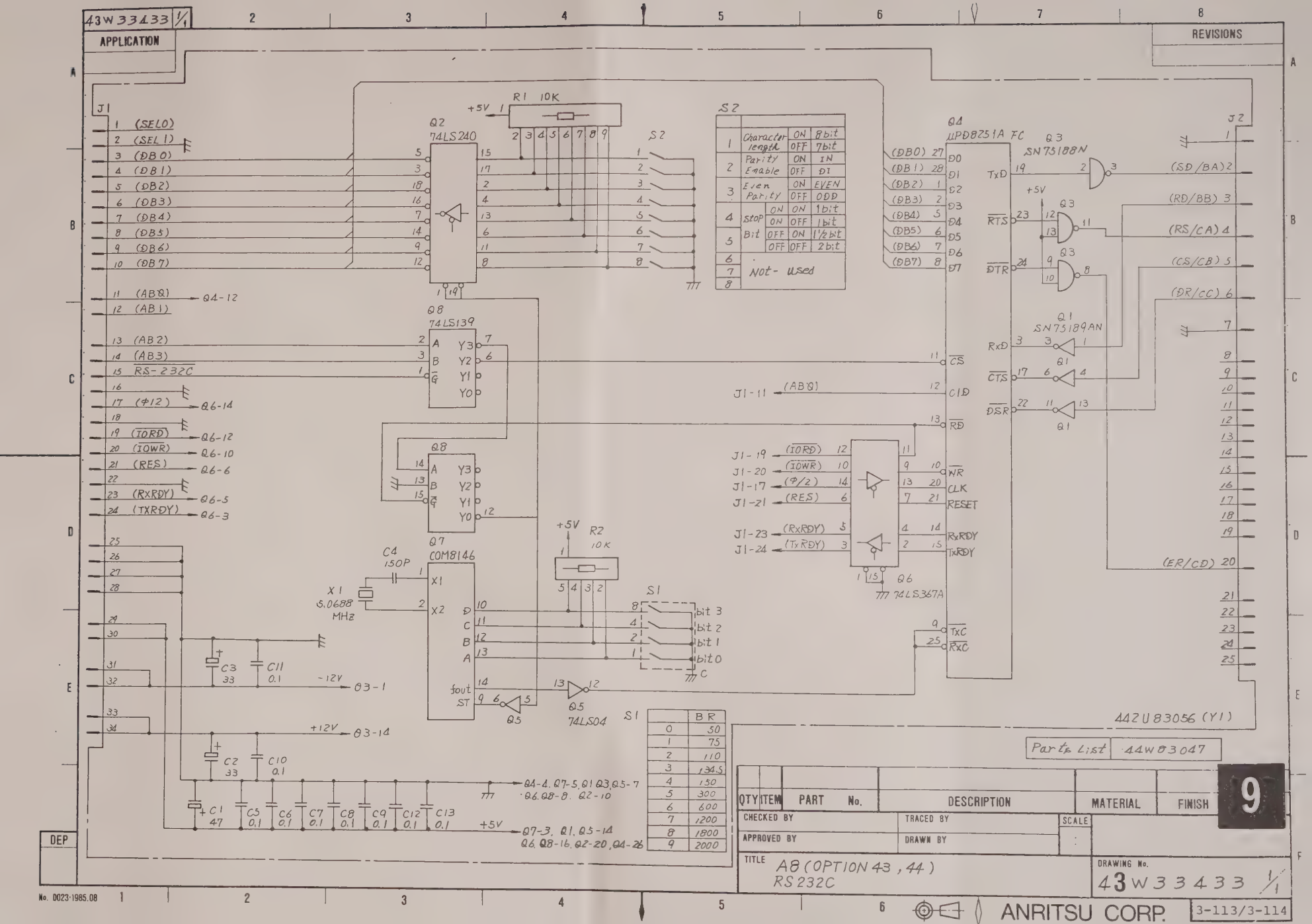


Fig. 3-64 RS-232C PC Board 9 Parts Layout


43W33433 1/1
APPLICATION
REVISIONS
J1
(SEL0)
(SEL1)
(DB0)
(DB1)
(DB2)
(DB3)
(DB4)
(DB5)
(DB6)
(DB7)
(AB0)
(AB1)
(AB2)
(AB3)
RS-232C
(Φ12)
(IORD)
(IOWR)
(RES)
(RxRDY)
(TxRDY)
Q4-12
Q6-14
Q6-12
Q6-10
Q6-6
Q6-5
Q6-3
R1 10K
+5V
Q2
74LS240
S2
Character length
Parity Enable
Even Parity
Stop Bit
8bit
7bit
IN
OUT
EVEN
ODD
1bit
1½bit
2bit
Not-used
Q4
μPD8251A FC
Q3
SN75188N
Q1
SN75189AN
Q8
74LS139
Q7
COM8146
X1
5.0688 MHz
C4 150P
C3 33
C11 0.1
C2 33
C10 0.1
C1 47
C5 0.1
C6 0.1
C7 0.1
C8 0.1
C9 0.1
C12 0.1
C13 0.1
-12V
+12V
Q3-1
Q3-14
R2 10K
S1
bit 3
bit 2
bit 1
bit 0
Q5
74LS04
Q6
74LS367A
J1-11 (AB0)
J1-19 (IORD)
J1-20 (IOWR)
J1-17 (Φ/2)
J1-21 (RES)
J1-23 (RxRDY)
J1-24 (TxRDY)
J2
(SD/BA) 2
(RD/BB) 3
(RS/CA) 4
(CS/CB) 5
(DR/CC) 6
(ER/CD) 20
Q4-4, Q7-5, Q1 Q3, Q5-7
Q6, Q8-8, Q2-10
Q7-3, Q1, Q5-14
Q6, Q8-16, Q2-20, Q4-26
S1
BR
0 50
1 75
2 110
3 134.5
4 150
5 300
6 600
7 1200
8 1800
9 2000
442U83056 (Y1)
Parts List 44W83047
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
APPROVED BY
TRACED BY
DRAWN BY
SCALE
TITLE A8 (OPTION 43, 44) RS232C
DRAWING No. 43W33433 1/1
DEP
9
No. 0023-1985.08
ANRITSU CORP.
3-113/3-114

3.6 Receiver Troubleshooting and Adjustment

3.6.1 Overall troubleshooting 10

Figure 3-65 is the receiver block diagram. The ME3401A receiver consists of A1 ERROR DET, A2 R-CONTROL, A3 R-DISPLAY, A4 R-SWITCH, A4 JITTER MEASUREMENT, A6 GP-IB, A7 RS-232C, and A8 PRINTER. For details of each circuit, refer to paragraphs 3.6.3 to 3.6.6.

If a problem is indicated by the performance check (operation manual, SECTION 9), locate the fault by using the following procedures.

[Step 1]

When the power switch is turned on, does the POWER-ON lamp come on?

If it does not come on,

AC operation

- AC power cord is not connected to the AC power supply or the AC power cord is disconnected.
- AC fuse on the rear panel is blown.
- AC power circuit (A2 and S1) is defective.
- LED (Q13-A3) is defective.

DC operation

- Abnormal DC supply voltage (specification: -22 to -53 V)
- Connection abnormal between DC power supply and DC input
- POWER circuit (A2 and S1) is defective.
- LED (Q13-A3) is defective.

[Step 2]

When each switch on the front panel is operated, does each display (including LEDs) come on normally?

If it does not come on,

A2 R-CONTROL is defective (paragraph 3.6.2).

A3 R-DISPLAY is defective (paragraph 3.6.4).

[Step 3]

Unless the DS-3 input, DS-1/DS-1C/DS-2 input, unipolar input, pattern, frame, measurement, and alarm detection are normal, A1 ERROR DET is abnormal (paragraph 3.6.3).

[Step 4]

Unless the printer is normal, A8 PRINTER is abnormal (paragraph 3.6.6).

[Step 5]

Unless JITTER MEASUREMENT is normal, A5 JITTER MEASUREMENT (paragraph 3.6.5) or A1 ERROR DET (paragraph 3.6.3) is abnormal.

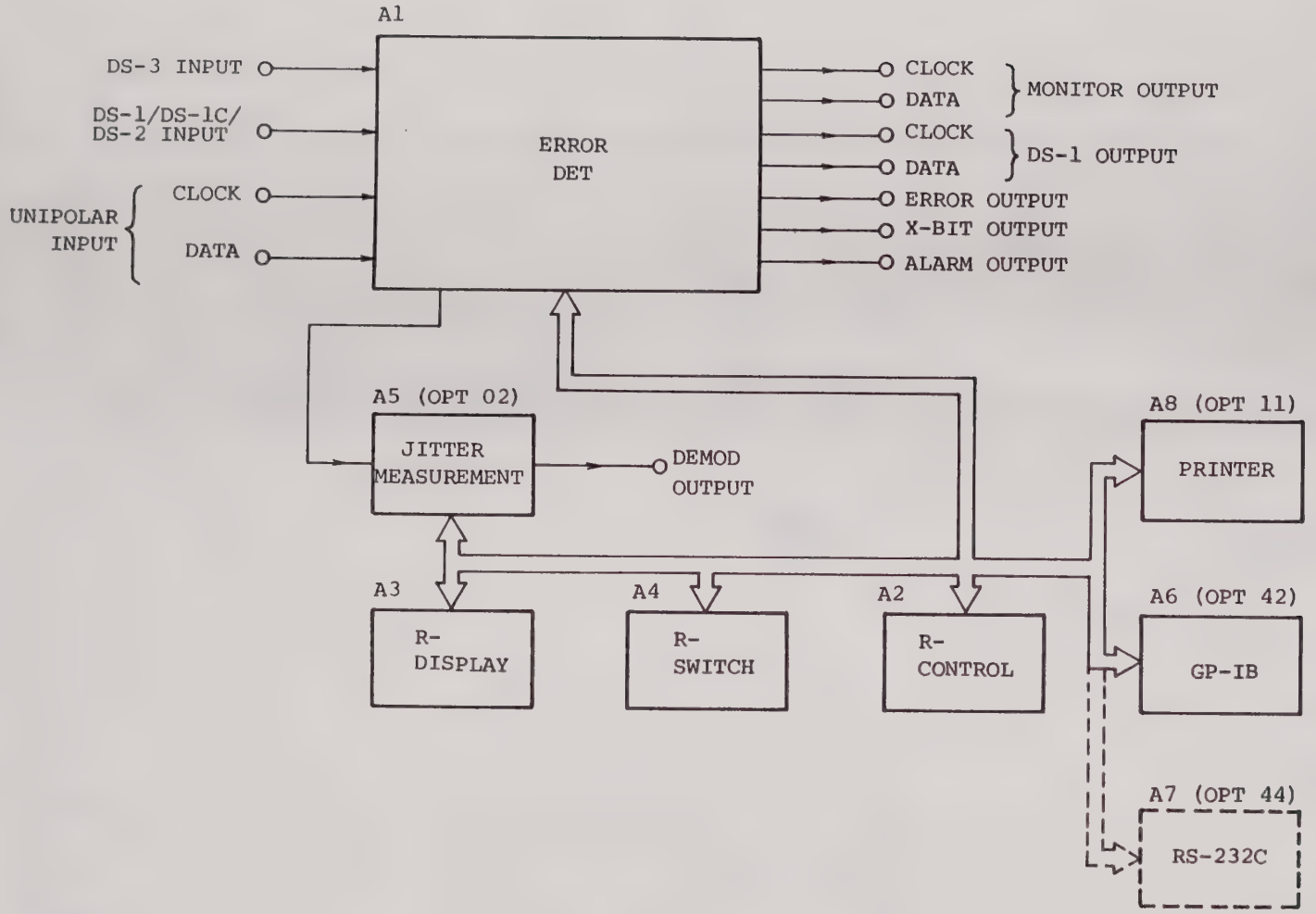
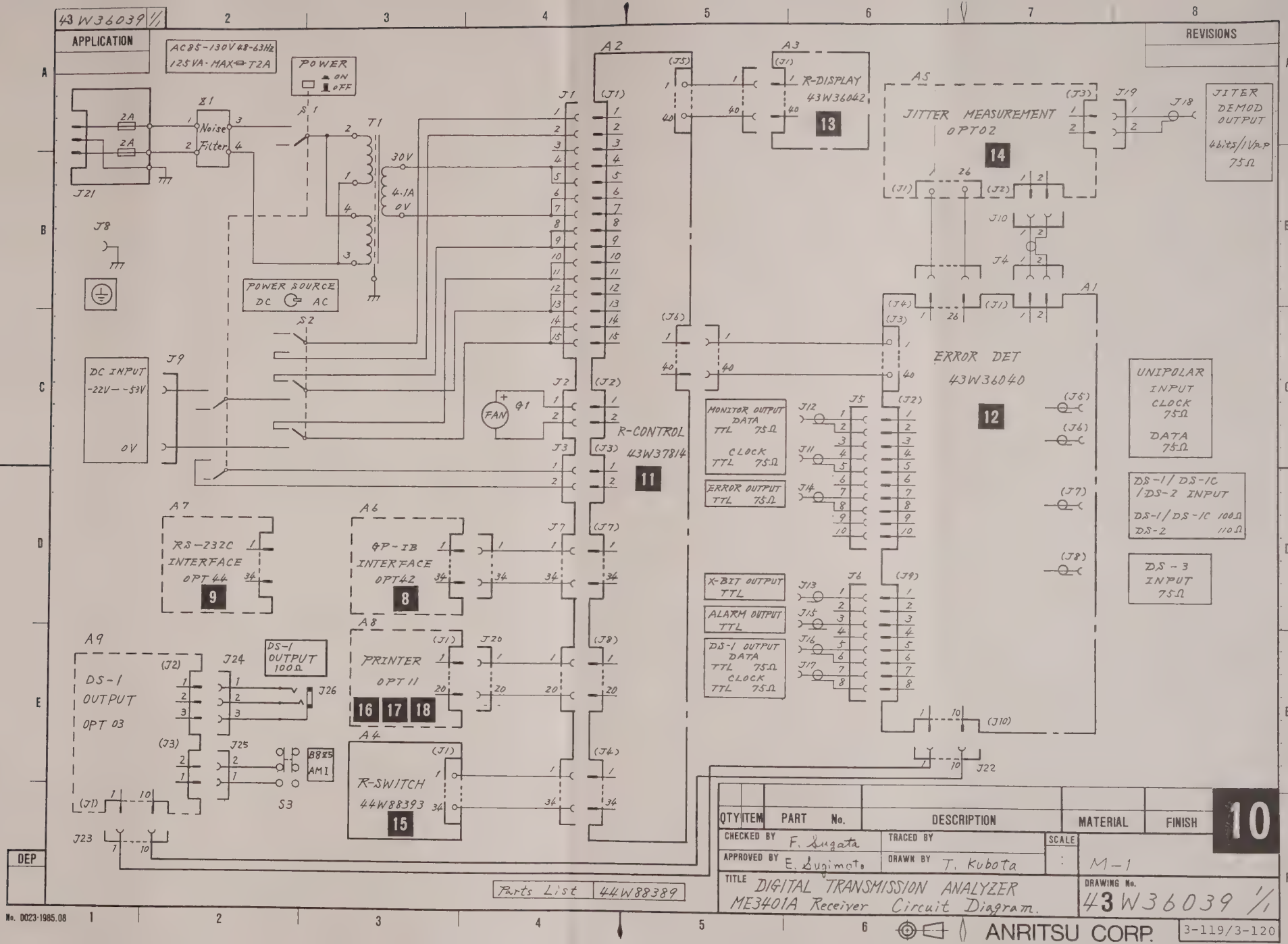


Fig. 3-65 Simplified Block Diagram of ME3401A Receiver


43W36039 1/1
APPLICATION
REVISIONS
AC85-130V 48-63Hz
125VA MAX ⊖ T2A
POWER
ON
OFF
Z1
Noise Filter
2A
2A
S1
T1
30V
4.1A
0V
J21
J8
POWER SOURCE
DC AC
S2
J9
DC INPUT
-22V — -53V
0V
FAN
Q1
A2
J1
J2
J3
R-CONTROL
43W37814
11
A3
R-DISPLAY
43W36042
13
A5
JITTER MEASUREMENT
OPT02
14
JITER DEMOD OUTPUT
46bits/1Vp-p
75Ω
J18
J19
J10
J4
A1
ERROR DET
43W36040
12
UNIPOLAR
INPUT
CLOCK
75Ω
DATA
75Ω
DS-1/DS-1C
/DS-2 INPUT
DS-1/DS-1C 100Ω
DS-2 110Ω
DS-3
INPUT
75Ω
MONITOR OUTPUT
DATA
TTL 75Ω
CLOCK
TTL 75Ω
ERROR OUTPUT
TTL 75Ω
X-BIT OUTPUT
TTL
ALARM OUTPUT
TTL
DS-1 OUTPUT
DATA
TTL 75Ω
CLOCK
TTL 75Ω
J5
J6
A7
RS-232C
INTERFACE
OPT44
9
A6
GP-IB
INTERFACE
OPT42
8
A8
PRINTER
OPT11
16 17 18
A4
R-SWITCH
44W88393
15
A9
DS-1
OUTPUT
OPT03
DS-1
OUTPUT
100Ω
J24
J26
J25
S3
8855
AMI
J23
J22
DEP
Parts List 44W88389
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY F. Sugata
APPROVED BY E. Sugimoto
TRACED BY
DRAWN BY T. Kubota
SCALE M-1
TITLE DIGITAL TRANSMISSION ANALYZER
ME3401A Receiver Circuit Diagram.
DRAWING No. 43W36039 1/1
10
No. 0023-1985.08
ANRITSU CORP.
3-119/3-120

3.6.2 A2 R-CONTROL PC board 11

(1) Circuit description

The A2 R-CONTROL circuit consists of the front-panel switches, display, each circuit, GP-IB, RS-232C, printer control circuit, and +5, +12, +24, -5.2, and -12 V power circuits.

(2) Troubleshooting

[Step 1]

Check the waveform between ❶ and ground using an oscilloscope. The waveform shown in Fig. 3-66 is normal. Check the frequency at ❶ using a frequency counter. A frequency of 4.000 MHz is normal. If the waveform and frequency are normal, proceed to the next step. If they are abnormal, troubleshoot the circuits related to Z1, Q54, and Q56.

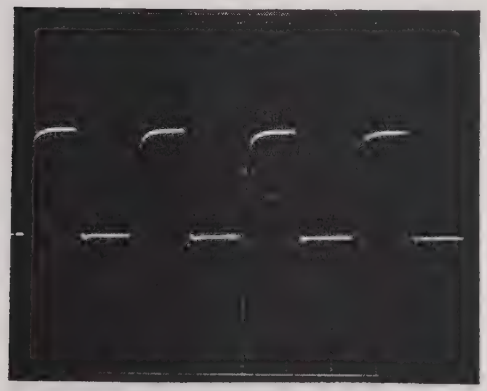


Fig. 3-66 Waveform at ❶

[Step 2]

Check the level between ❷ and ❸, and ground using an oscilloscope. The waveforms shown in Fig. 3-67 are normal.

If the waveforms are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❷ and ❸.

[Step 3]

Check the waveform between ❹ and ground using an oscilloscope.

The waveforms shown in Fig. 3-67 are normal.

If the waveforms are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❹.

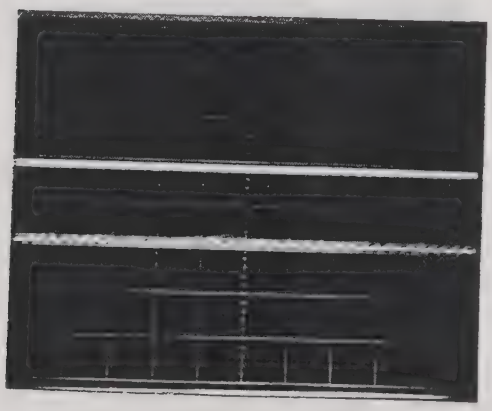


Fig. 3-67 Waveforms at ❹

[Step 4]

Check the voltage between ❺ and ground using a DC voltmeter. A voltage within +2.5 to +4 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Z2 and R60.

[Step 5]

Check the waveform between ❻ and FG using an oscilloscope.

The waveform shown in Fig. 3-68 is normal. Also, check that the voltage between ❻ and FG is within +30 to +50 V.

If the waveform and voltage are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❻.

V: 10 V/div
H: 5 ms/div

Fig. 3-68 Waveform at ❼

[Step 6]

Check the voltage between ❼ and FG using a DC voltmeter. A voltage within +13 to +18 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❼.

[Step 7]

Check the waveform between ❽ and FG using an oscilloscope.

The waveform shown in Fig. 3-69 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❽.

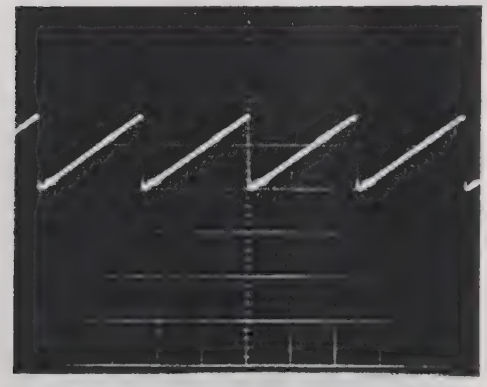


Fig. 3-69 Waveform at ❽

[Step 8]

Check the waveforms between ❾ and ❿, and FG using an oscilloscope. The waveforms shown in Fig. 3-70 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❾ and ❿.

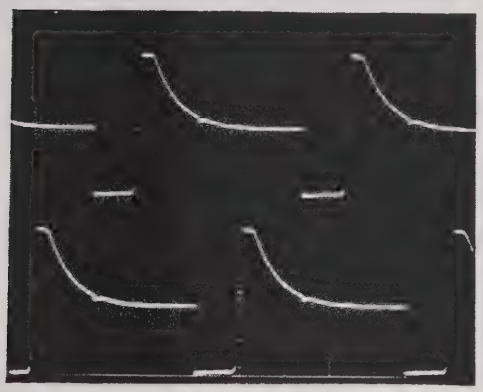


Fig. 3-70 Waveforms at ❾ and ❿

[Step 9]

Check the waveform between ⓫ and FG using an oscilloscope.

The waveform shown in Fig. 3-71 is normal.

If it is normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ⓫.

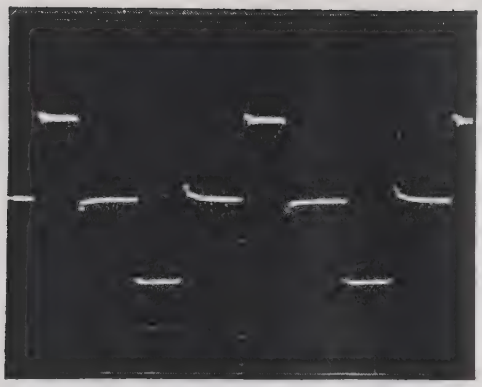


Fig. 3-71 Waveform at ⓫

[Step 10]

Check the waveform between ⓬ and FG using an oscilloscope probe.

The waveform shown in Fig. 3-72 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ⓬.

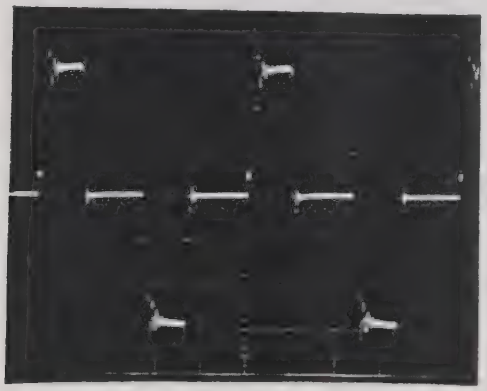


Fig. 3-72 Waveform at ⓬

[Step 11]

Check the voltage between ⑯ and ground using a DC voltmeter.

A voltage within -5.0 to -5.5 V is normal.

If it is normal, proceed to the next step.
If it is abnormal, adjust R40.

If it is still abnormal, troubleshoot circuits ⑫ to ⑯, and ⑱ to ⑮, and the circuit related to R40.

[Step 12]

Check the voltage between ⑬, ⑭, ⑮, ⑰ and grounds using a DC voltmeter.

Test Point	Voltage range
⑭	+4.8 V to +5.5 V
⑮	-11.4 V to -12.6 V
⑯	+11.4 V to +12.6 V
⑱	+22.8 V to +25.2 V

Voltages within the above voltages are normal.
If they are abnormal, troubleshoot the circuits related to ⑬, ⑭, ⑮, and ⑰.

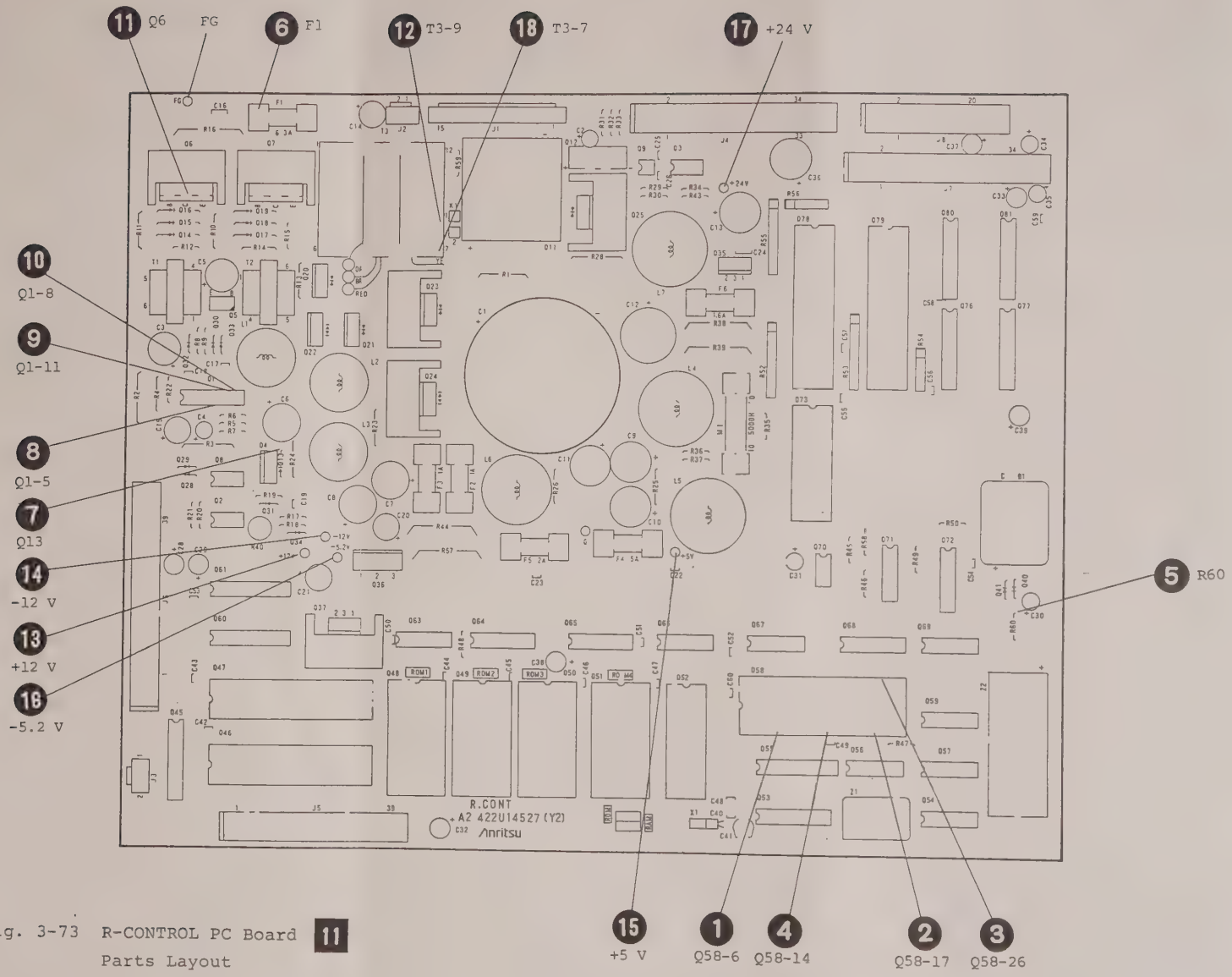
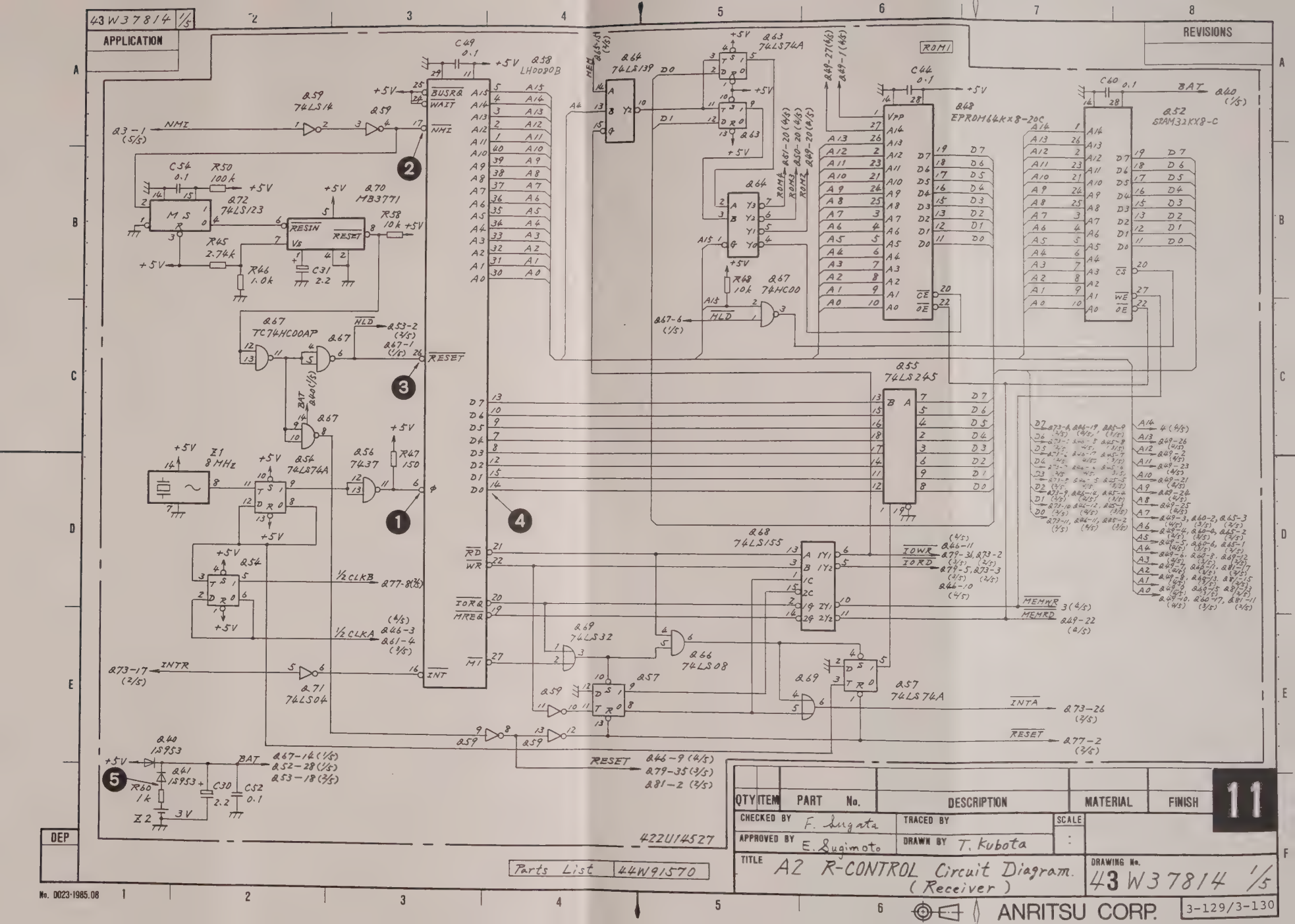
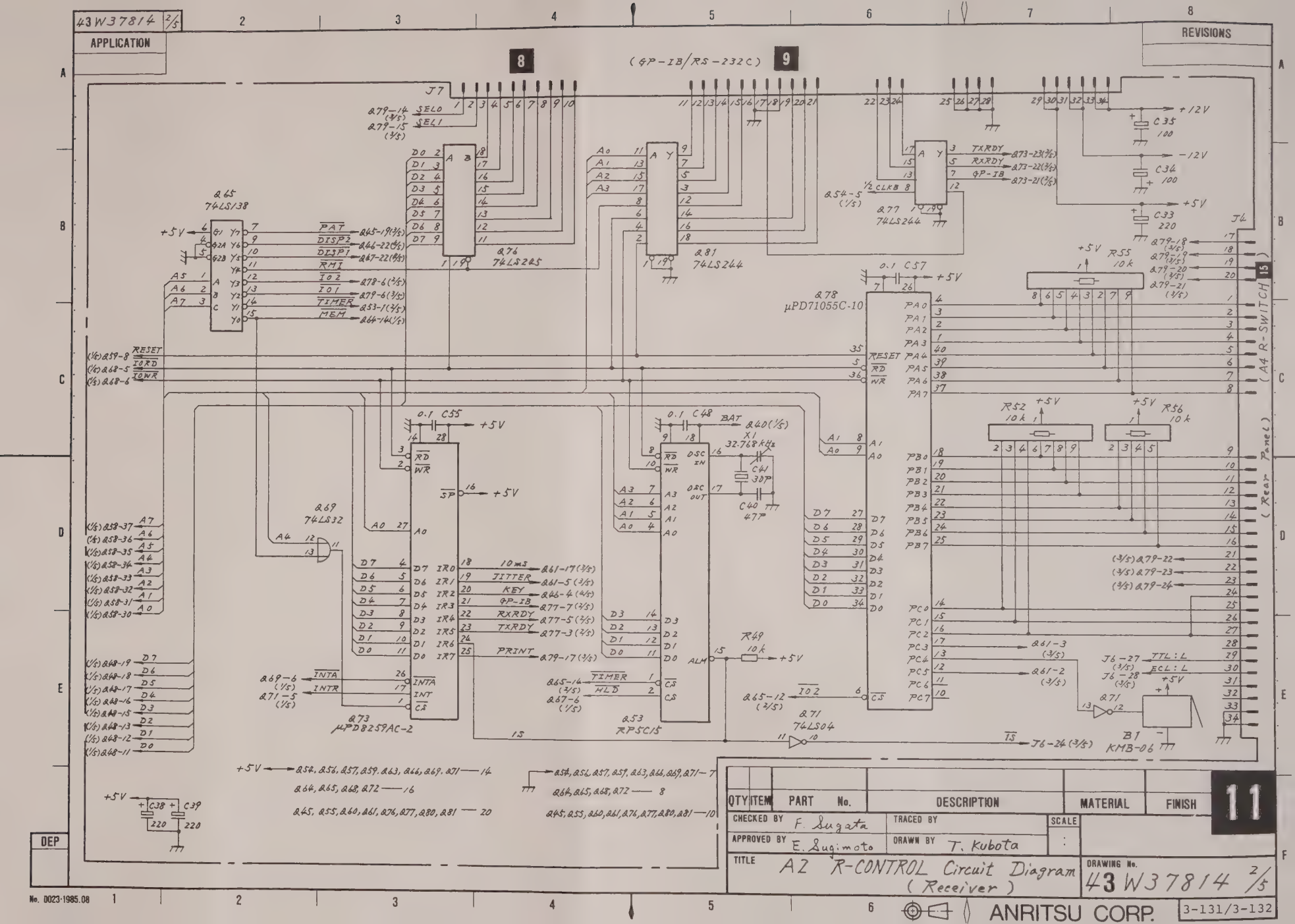
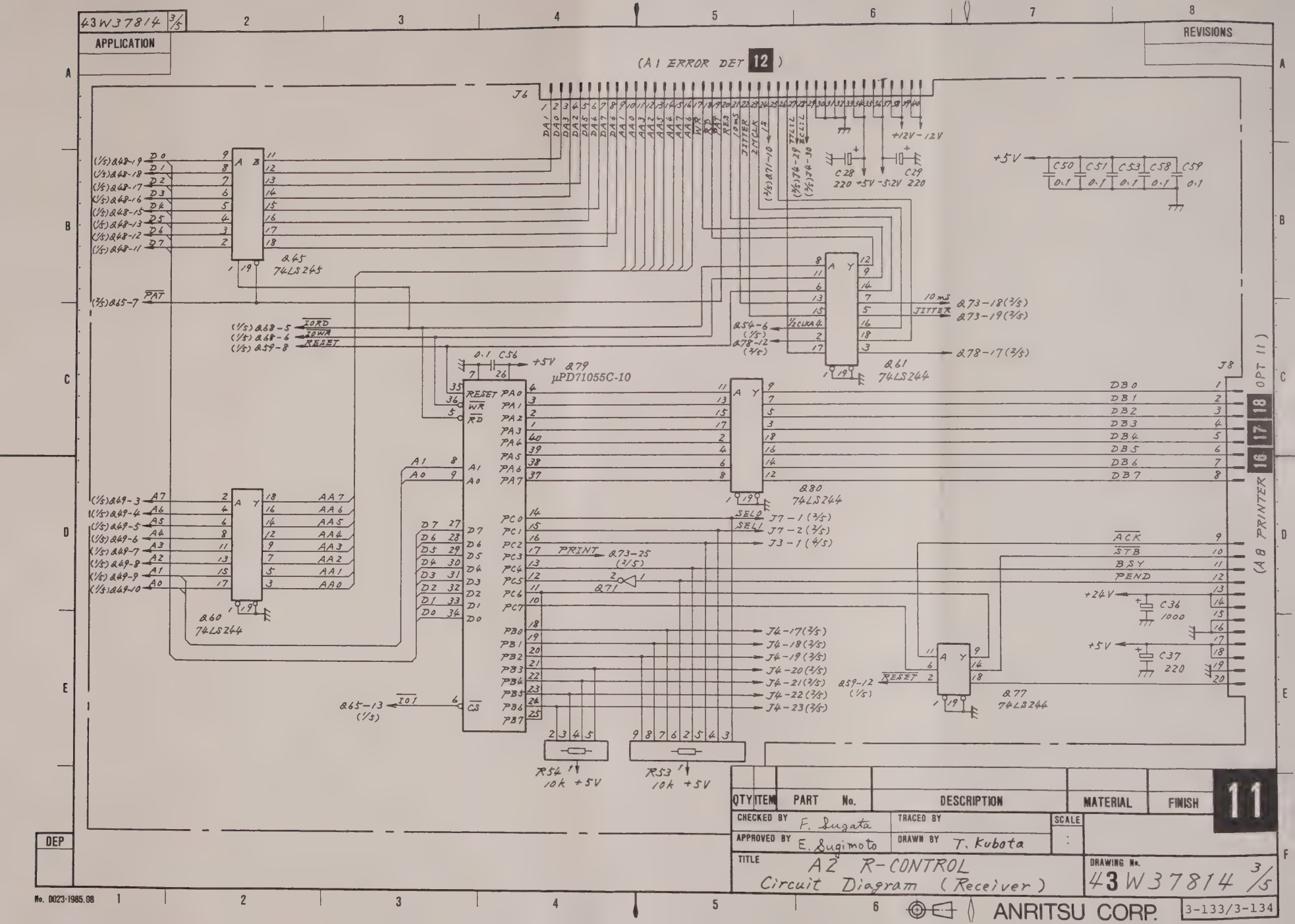


Fig. 3-73 R-CONTROL PC Board 11
Parts Layout

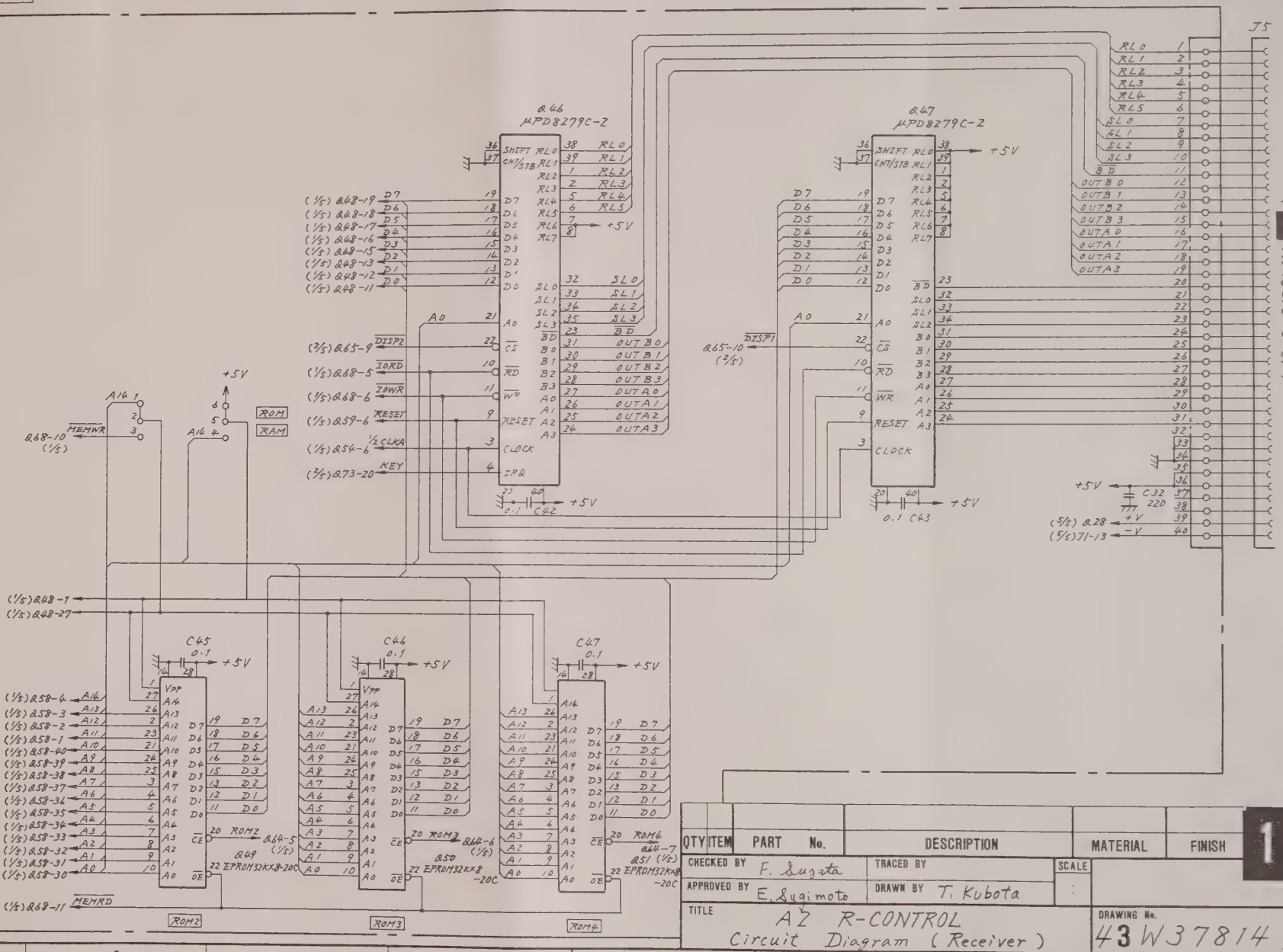

43W37814 1/5
APPLICATION
REVISIONS
ROM1
Q58 LH0080B
Q59 74LS14
Q72 74LS123
Q70 MB3771
Q64 74LS139
Q63 74LS74A
Q48 EPROM64Kx8-20C
Q52 SRAM32KX8-C
Q67 TC74HC00AP
Q67 74HC00
Q55 74LS245
Q68 74LS155
Q69 74LS32
Q66 74LS08
Q57 74LS74A
Q71 74LS04
Q54 74LS74A
Q56 7437
Q40 1S953
Z1 8 MHz
Z2 3V
NMI
INTR
RESET
HLD
BAT
IOWR
IORD
MEMWR
MEMRD
INTA
RD
WR
IORQ
MREQ
M1
½CLKB
½CLKA
BUSRQ
WAIT
Parts List 44W91570
422U14527
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY F. Sugata
TRACED BY
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota
SCALE
TITLE A2 R-CONTROL Circuit Diagram. (Receiver)
DRAWING No. 43W37814 1/5
DEP
11
ANRITSU CORP.
3-129/3-130
No. 0023-1985.08


43W37814 2/5
APPLICATION
REVISIONS
8
9
(GP-IB/RS-232C)
J7
Q45 74LS138
Q76 74LS245
Q81 74LS244
Q77 74LS244
Q78 μPD71055C-10
Q69 74LS32
Q73 μPD8259AC-2
Q53 RP5C15
Q71 74LS04
B1 KMB-06
X1 32.768kHz
C35 100
C34 100
C33 220
C38 220
C39 220
C57 0.1
C55 0.1
C48 0.1
C41 30P
C40 47P
R49 10k
R52 10k
R55 10k
R56 10k
+5V
-12V
+12V
BAT
RESET
IORD
IOWR
RD
WR
INTA
INTR
INT
CS
SP
PRINT
TIMER
HLD
IO2
TXRDY
RXRDY
GP-IB
SEL0
SEL1
PAT
DISP2
DISP1
RMI
IO1
MEM
10ms
JITTER
KEY
ALM
J4
J6
A4 R-SWITCH (Rear Panel)
DEP
QTY ITEM PART No.
DESCRIPTION
MATERIAL
FINISH
CHECKED BY F. Sugata
TRACED BY
SCALE
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota
TITLE A2 R-CONTROL Circuit Diagram (Receiver)
DRAWING No. 43W37814 2/5
No. 0023-1985.08
ANRITSU CORP.
3-131/3-132


43W37814 3/5
APPLICATION
REVISIONS
(A1 ERROR DET 12)
J6
DA1 DA0 DA3 DA2 DA5 DA4 DA7 DA6 AA1 AA0 AA3 AA2 AA5 AA4 AA7 AA6 WR RD RST RES 10mS JITTER 2CYCLK 1/8 (1/5)Q71-10 (3/5)Q74-29 TCLL (3/5)Q74-30 SCLL
+12V -12V
C28 220 +5V -5.2V C29 220
+5V C50 0.1 C51 0.1 C53 0.1 C58 0.1 C59 0.1
Q45 74LS245
(1/5)Q48-19 D0
(1/5)Q48-18 D1
(1/5)Q48-17 D2
(1/5)Q48-16 D3
(1/5)Q48-15 D4
(1/5)Q48-13 D5
(1/5)Q48-12 D6
(1/5)Q48-11 D7
(3/5)Q65-7 PAT
(1/5)Q68-5 IORD
(1/5)Q68-6 IOWR
(1/5)Q59-8 RESET
0.1 C56 +5V
Q79 μPD71055C-10
RESET WR RD CS A1 A0
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7
PC0 PC1 PC2 PC3 PC4 PC5 PC6 PC7
D7 D6 D5 D4 D3 D2 D1 D0
(1/5)Q65-13 IOI
Q61 74LS244
Q80 74LS244
Q77 74LS244
Q60 74LS244
(1/5)Q49-3 A7
(1/5)Q49-4 A6
(1/5)Q49-5 A5
(1/5)Q49-6 A4
(1/5)Q49-7 A3
(1/5)Q49-8 A2
(1/5)Q49-9 A1
(1/5)Q49-10 A0
AA7 AA6 AA5 AA4 AA3 AA2 AA1 AA0
10mS Q73-18(3/5)
JITTER Q73-19(3/5)
(1/5)Q54-6 ½CLK4
(1/5)Q78-12 (1/5)
Q78-17(3/5)
SEL0 J7-1(3/5)
SEL1 J7-2(3/5)
J3-1(4/5)
PRINT Q73-25 (3/5)
Q71
J4-17(3/5)
J4-18(3/5)
J4-19(3/5)
J4-20(3/5)
J4-21(3/5)
J4-22(3/5)
J4-23(3/5)
Q59-12 (1/5) RESET
R54 10k +5V
R53 10k +5V
J8
DB0 DB1 DB2 DB3 DB4 DB5 DB6 DB7
ACK STB BSY PEND
+24V C36 1000
+5V C37 220
(A8 PRINTER OPT 11)
16 17 18
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
11
CHECKED BY F. Sugata
TRACED BY
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota
SCALE :
TITLE A2 R-CONTROL Circuit Diagram (Receiver)
DRAWING No. 43W37814 3/5
No. 0023-1985.08
ANRITSU CORP.
3-133/3-134

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

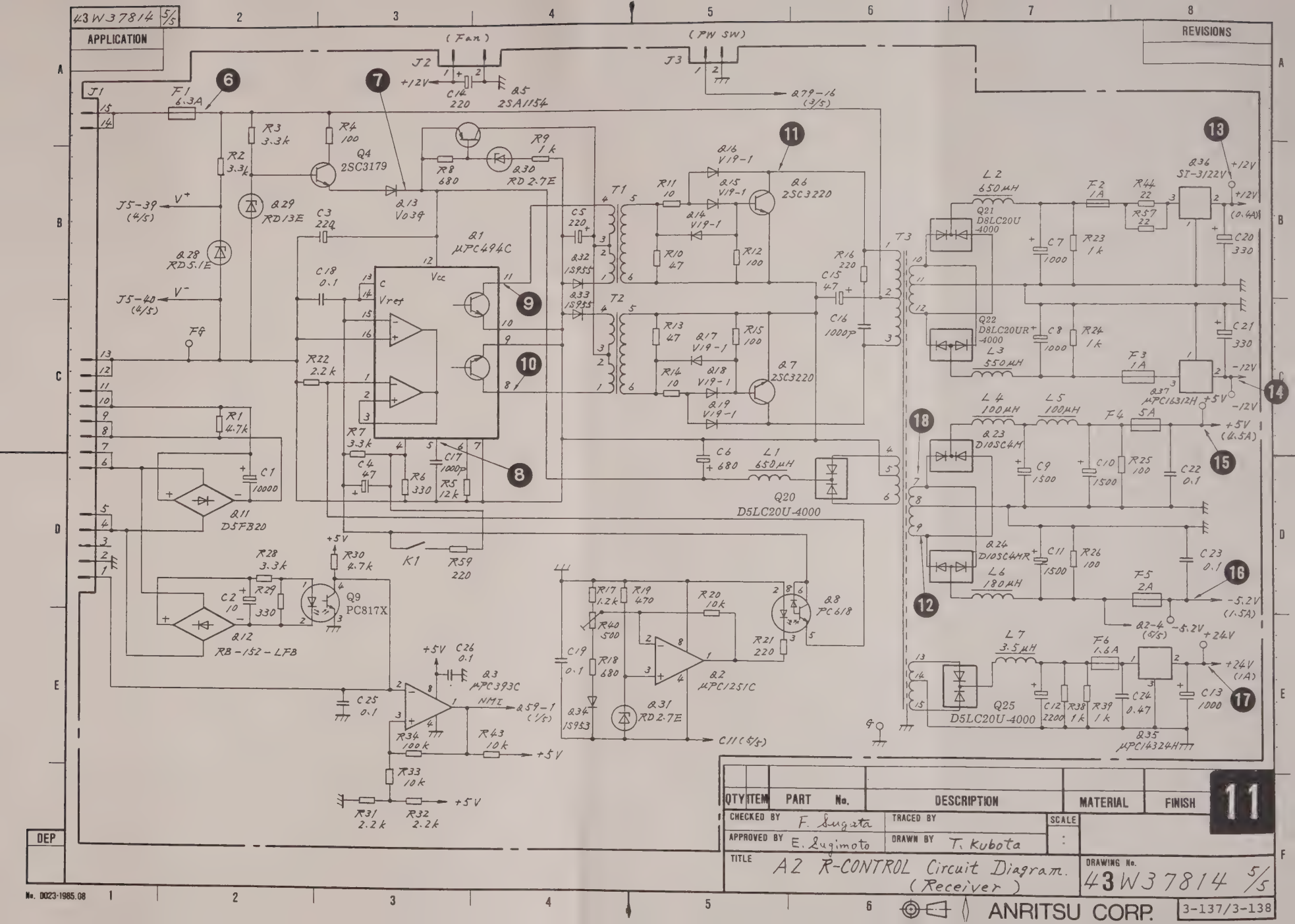
TITLE A2 R-CONTROL Circuit Diagram (Receiver)

DRAWING No. 43W37814 4/5

DEP

11

13 (A3 R-DISPLAY)


43W37814 5/5
APPLICATION
REVISIONS
(Fan)
(PW SW)
J1
J2
J3
F1 6.3A
+12V
C14 220
Q5 2SA1154
Q79-16 (3/5)
R3 3.3k
R4 100
R2 3.3k
Q4 2SC3179
R9 1k
R8 680
Q30 RD2.7E
J5-39 V+ (4/5)
Q29 RD13E
Q13 V034
Q28 RD5.1E
J5-40 V- (4/5)
C3 22p
Q1 μPC494C
C18 0.1
Vcc
C
Vref
R22 2.2k
R7 3.3k
C4 47
C17 1000p
R6 330
R5 12k
FG
R1 4.7k
C1 10000
Q11 D5FB20
T1
T2
T3
C5 220
Q32 1S955
Q33 1S955
R11 10
R10 47
R12 100
R13 47
R14 10
R15 100
Q16 V19-1
Q15 V19-1
Q14 V19-1
Q17 V19-1
Q18 V19-1
Q19 V19-1
Q6 2SC3220
Q7 2SC3220
R16 220
C15 47
C16 1000p
C6 680
L1 650μH
Q20 D5LC20U-4000
K1
R59 220
+5V
R30 4.7k
R28 3.3k
C2 10
R29 330
Q9 PC817X
Q12 RB-152-LFB
R17 1.2k
R19 470
R20 10k
R40 500
R18 680
C19 0.1
Q31 RD2.7E
Q2 μPC1251C
Q8 PC618
R21 220
C11 (5/5)
+5V C26 0.1
Q3 μPC393C
C25 0.1
NMI
Q59-1 (1/5)
R34 100k
R43 10k
R33 10k
R31 2.2k
R32 2.2k
L2 650μH
Q21 D8LC20U 4000
F2 1A
R44 22
R57 22
Q36 SI-3122V
+12V (0.4A)
C20 330
C7 1000
R23 1k
Q22 D8LC20UR 4000
C8 1000
R24 1k
C21 330
L3 550μH
F3 1A
Q37 μPC1632H
-12V
L4 100μH
L5 100μH
F4 5A
+5V (2.5A)
Q23 D10SC4M
C9 1500
C10 1500
R25 100
C22 0.1
Q24 D10SC4MR
C11 1500
R26 100
C23 0.1
L6 180μH
F5 2A
-5.2V (1.5A)
Q2-4 (5/5)
-5.2V
+24V
L7 3.5μH
F6 1.6A
+24V (1A)
C12 2200
R38 1k
R39 1k
C24 0.47
C13 1000
Q25 D5LC20U-4000
Q35 μPC1432H
6
7
8
9
10
11
12
13
14
15
16
17
18
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY F. Sugata
TRACED BY
SCALE :
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota
TITLE A2 R-CONTROL Circuit Diagram. (Receiver)
DRAWING No. 43W37814 5/5
DEP
No. 0023-1985.08
ANRITSU CORP.
3-137/3-138

3.6.3 A1 ERROR DET PC board 12

(1) Circuit description

Figure 3-74 is the block diagram of this circuit. The A1 ERROR DET circuit consists of INPUT, AGC, B/U CONVERTER, CODE CONVERTER, CLOCK RECOVERY, FRAM synchronization, ERROR DET, OUTPUT, and MEASUREMENT circuits.

Four input circuits (DS-3, DS-1/1C/2, unipolar clock, and unipolar data) shape the waveform of the input signal. The AGC circuit keeps the DS-3, DS-1/1C/2 input signal level constant.

The B/U CONVERTER circuit converts the bipolar signal to a unipolar signal.

The CODE CONVERTER circuit detects errors as well as converts signals with B3ZS, B6ZS, and B8ZS codes to signals without codes.

The clock recovery circuit extracts the clock signal from the unipolar RZ signal.

The frame synchronization circuit synchronizes with the input signal frame and detects the frame errors, parity errors, and CRC-6 errors. The error detection circuit makes bit-by-bit comparison and detects errors after synchronizing the reference pattern signal generated within the input pattern signal.

The MEASUREMENT circuit counts the five types of detected error separately (bit error, frame error, parity error, CRC-6 error, and bipolar error).

CLOCK and DATA are output as the MONITOR output and DATA, CLOCK, ERROR, X-BIT are output as the DS-1 output. The clock signal is also output to the A5 JITTER MEASUREMENT circuit.

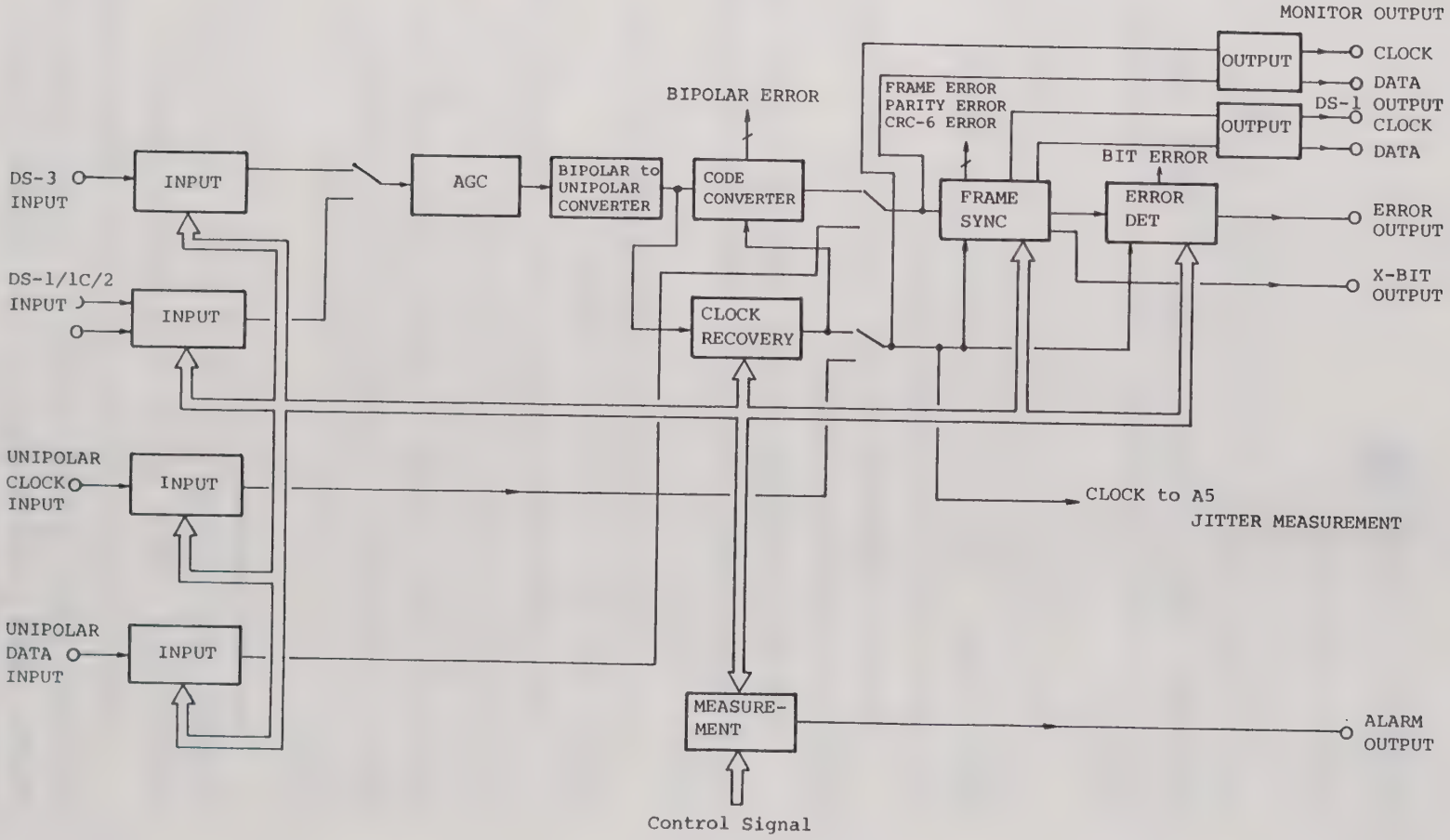


Fig. 3-74 A1 ERROR DET Block Diagram

(2) Troubleshooting and adjustment

(a) Checking DSX-3

Set-up as shown in Fig. 3-75.

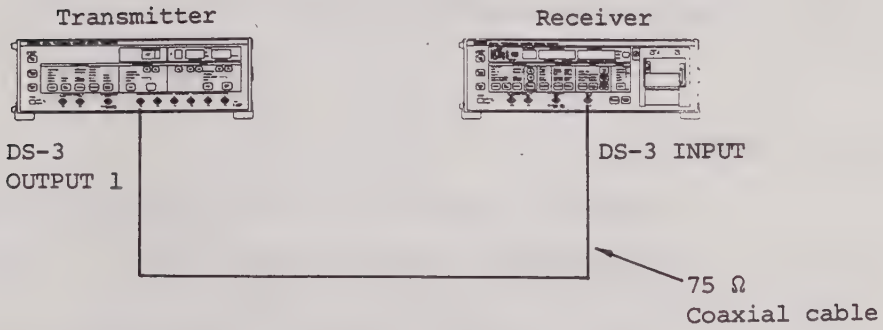


Fig. 3-75 Setup

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-3
FRAME	:	FRAMED
PATTERN	:	PRBS
DS-3 LEVEL	:	DSX-3
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	DSX-3 H/L
FRAME	:	FRAMED
PATTERN	:	PRBS
FUNCTION SWITCH A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❷ using an oscilloscope.

The waveform shown in Fig. 3-76 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R2 so that the waveform at ❷ is as shown in Fig. 3-76.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J8 to (2).

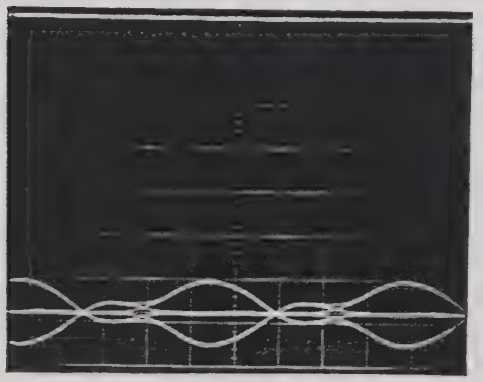


Fig. 3-76 Waveform at ❷

[Step 2]

Check the waveform at ❺ using an oscilloscope.

The waveform shown in Fig. 3-77 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R49 so that the waveform at ❺ is as shown in Fig. 3-77.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to ❷ to ❺.

Fig. 3-77 Waveform at ❺

[Step 3]

Check the waveforms at ❻ and ❼ using the oscilloscope.

The waveforms shown in Fig. 3-78 are normal.

If they are normal, proceed to the next step.

If they are abnormal, make the following adjustment.

Adjustment

1. Adjust R130 so that the waveform at ❻ is as shown in Fig. 3-78.
2. Adjust R118 so that the waveform at ❼ is as shown in Fig. 3-78.

If the waveforms are abnormal after the adjustments described above have been made, troubleshoot the circuits related to ❺ to ❻ and ❺ to ❼.

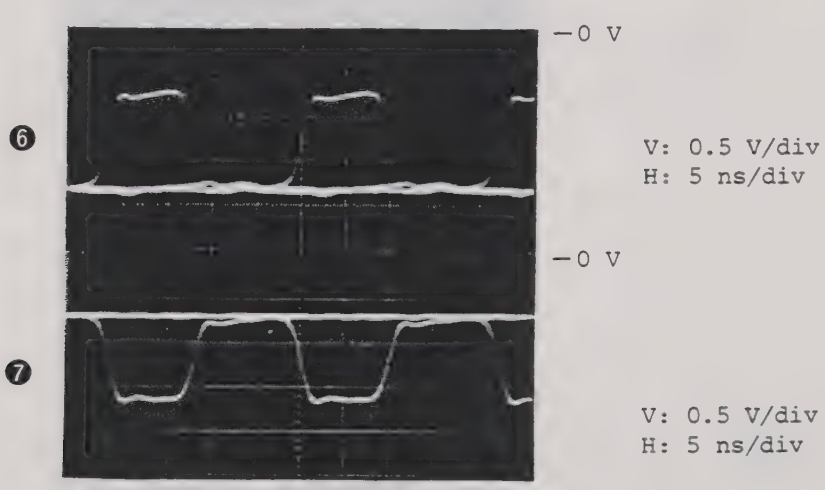


Fig. 3-78 Waveforms at ❻ and ❼

[Step 4]

Check the waveform at ❽ using an oscilloscope probe.

The waveform shown in Fig. 3-79 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❻ to ❽, and ❼ to ❽.

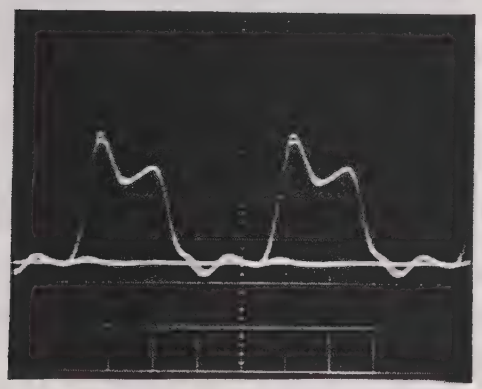


Fig. 3-79 Waveform at ❽

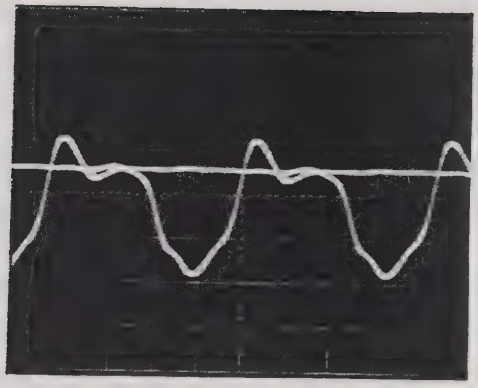
[Step 5]

Check the waveform at ❾ using an oscilloscope probe.

The waveform shown in Fig. 3-80 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❽ and ❾.



V: 0.5 V/div
H: 5 ns/div

Fig. 3-80 Waveform at ❽

[Step 6]

Check the waveform at ⓫ using an oscilloscope.

The waveform shown in Fig. 3-81 is normal.

Also, remove the cable connected to DS-3 INPUT and check the frequency at ⓫ using a frequency counter.

A frequency of 44.288 to 45.183 MHz is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

1. Adjust R147 so that the waveform at ⓫ is as shown in Fig. 3-81.
2. Adjust the frequency at ⓫ according to the following procedures.
   - Remove the cable connected to DS-3 INPUT.
   - Counter J12 to the [FSET] side.

- Adjust R144 so that the frequency at ⓫ is 44.288 to 45.183 MHz.
- Connect J12 to [FADJ] side.
- Turn the power switch off and then turn it on again.

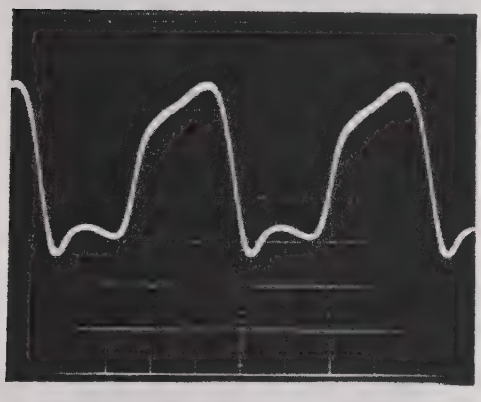


Fig. 3-81 Waveform at ⓫

[Step 7]

Check the waveforms and phases at ⓬ and ⓭ using an oscilloscope.

The waveforms and phases shown in Fig. 3-82 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q70 to ⓭, and ❽ to ⓬.

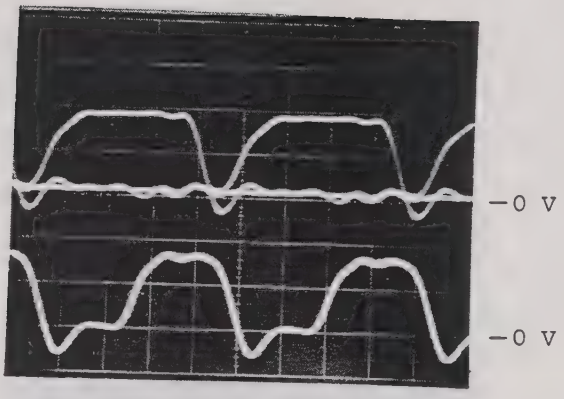


Fig. 3-82 Waveform at ⑫ and ⑬

[Step 8]

Check the waveforms and phases at ⑯ and ⑰ using an oscilloscope. The waveforms and phases shown in Fig. 3-83 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q95 to ⑯, and Q92 to ⑰.

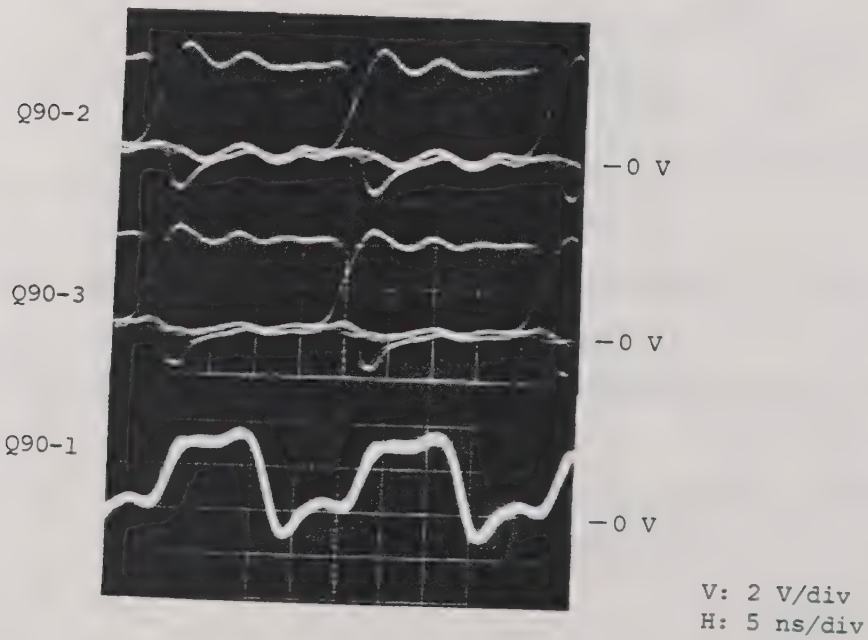


Fig. 3-83 Waveforms at ⑯ and ⑰

[Step 9]

Check the waveform at ⑱ using an oscilloscope probe.

The waveform shown in Fig. 3-84 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to Q90.

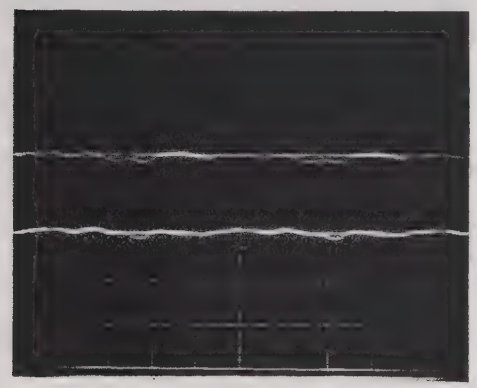


Fig. 3-84 Waveform at ⑱

[Step 10]

Check the waveforms at ⑲, ⑳, ㉑, and ㉒ using an oscilloscope. The waveforms shown in Fig. 3-85 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q90.

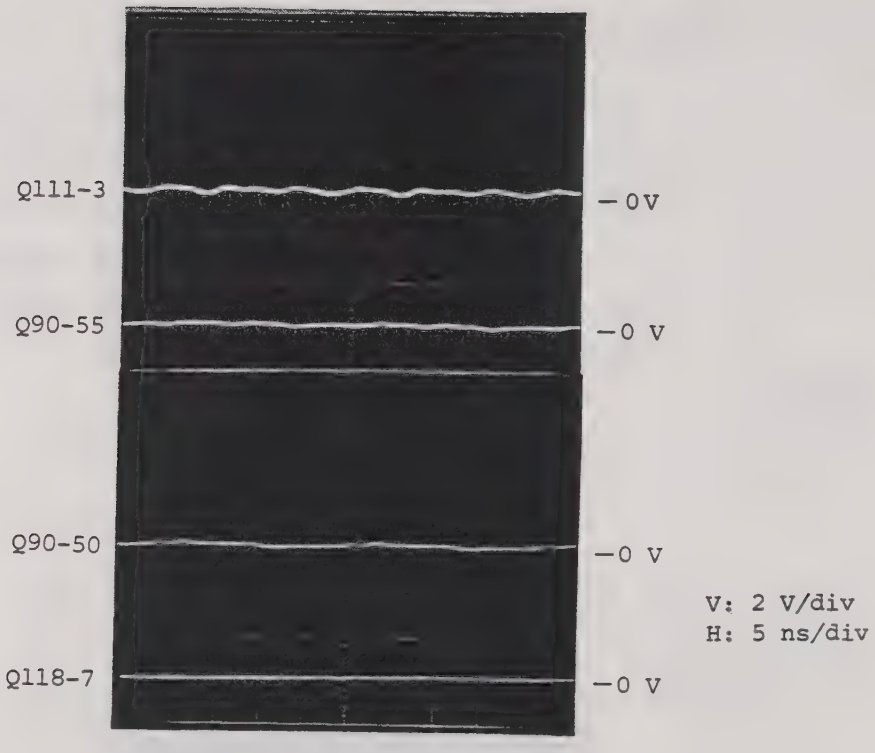


Fig. 3-85 Waveforms at ⑲, ⑳, ㉑, and ㉒

[Step 11]

Check the frequencies at ㉓, ㉔, ㉕, and ㉖ using a frequency counter. The frequencies shown in Table 3-11 are normal. If they are normal, proceed to the next step.

In the following cases, troubleshoot the corresponding circuit.

If ㉓ is abnormal, troubleshoot the circuits related to ⑬ to ㉓

If ㉔ is abnormal, troubleshoot the circuits related to J3-21 to ㉔

If ㉕ is abnormal, troubleshoot the circuits related to J3-21 to ㉕

If ㉖ is abnormal, troubleshoot the circuits related to Q46 to ㉖

Table 3-11 Frequencies at ㉓, ㉔, ㉕ and ㉖

Test point		Frequency
㉓	Q123-18	699 kHz
㉔	Q120-18	2.000 MHz
㉕	Q120-17	100 Hz
㉖	Q46-9	10 Hz

[Step 12]

Check the waveforms at ㉗ using an oscilloscope probe.

The waveforms shown in Fig. 3-86 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ⑳ to ㉗.

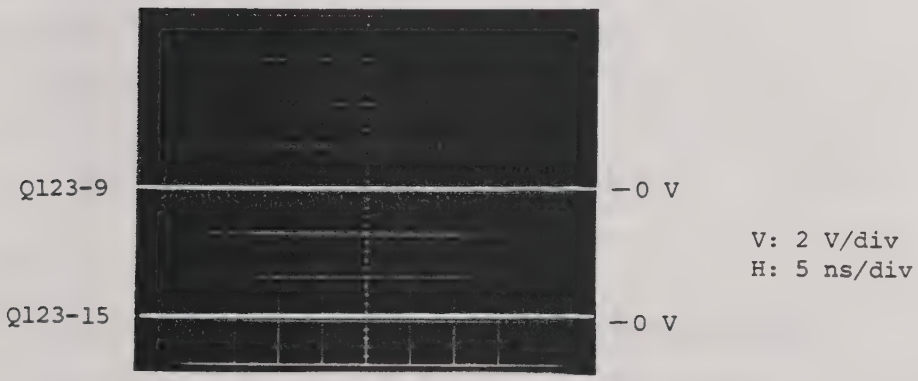


Fig. 3-86 Waveforms at ㉗

[Step 13]

Set the receiver INPUT to UNIPOLAR.

Check the voltage at ㉘ using a DC voltmeter.

A voltage of +9.8 to +10.2 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

1. Adjust the voltage at Q91-7 to +2.70 using R186.
2. Adjust the voltage at Q73-6 to +10.0 V using R188.

If the voltage is abnormal after the above adjustments have been made, troubleshoot the circuits related to J3 to ㉘.

[Step 14]

Check the voltage at ㉚ using an oscilloscope.

The voltages shown in Table 3-12 are normal.

If they are normal, DSX-3 is normal.

Table 3-12 Voltages at 3-12 ㉚

	Voltage
Q96-10	H
Q96-11	H
Q96-12	H
Q96-13	H

H: +2 V to +5 V

(b) Checking DS-3

Set-up as shown in Fig. 3-75. Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-3
FRAME	:	FRAMED
PATTERN	:	PRBS
DS-3 LEVEL	:	HIGH
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	DS-3 H/L
FRAME	:	FRAMED
PATTERN	:	PRBS
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform ❶ using an oscilloscope.

The waveform shown in Fig. 3-87 is normal.

If it is normal, check paragraph 3.6.3 (2) (a) step 2 and subsequent steps.

If all are normal, DS-3 is normal.

If they are abnormal, troubleshoot the circuits related to J8 to ❶.

Fig. 3-87 Waveform at ❶

(c) Checking DS-2

Set-up as shown in Fig. 3-88.

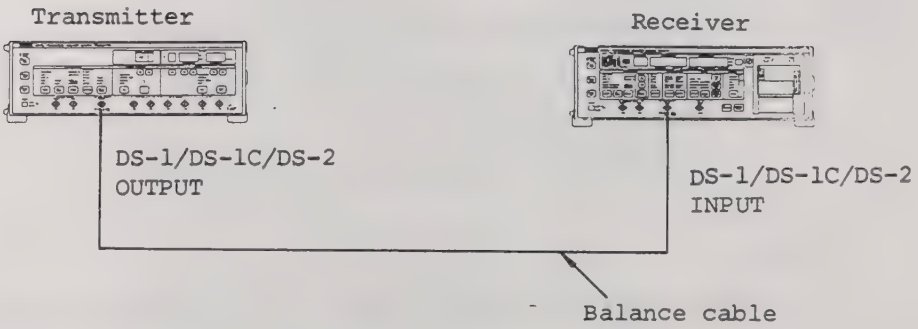


Fig. 3-88 Setup

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-2
FRAME	:	FRAMED
PATTERN	:	PRBS
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	DS-2
FRAME	:	FRAMED
PATTERN	:	PRBS
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❹ using an oscilloscope probe.

The waveform shown in Fig. 3-89 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J7 to ❹.

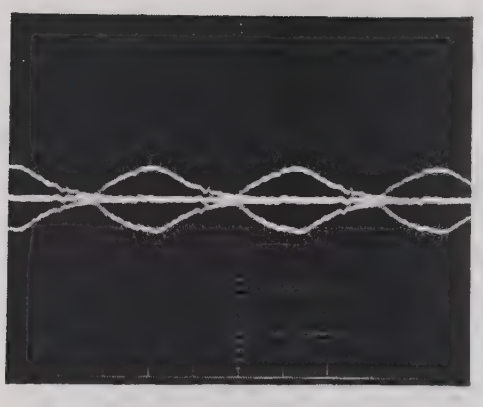


Fig. 3-89 Waveform at ❹

[Step 2]

Check the waveform at ⓫ using an oscilloscope.

The waveform shown in Fig. 3-90 is normal. Also, remove the cable connected to DS-1/1C/2 INPUT and check the frequency at ⓫ using a frequency counter.

A frequency of 6.248 to 6.375 MHz is normal.

If it is normal, check the other items.

If it is abnormal, make the following adjustments.

Adjustment

1. Adjust R158 so that the waveform at ⓫ is as shown in Fig. 3-90.
2. Adjust the frequency at ⓫ using the following procedure.
   - Remove the cable connected to DS-1/1C/2 INPUT.
   - Connect J12 to the [FSET] side.

- Adjust R155 so that the frequency at ⓫ is 6.248 to 6.375 MHz.
- Connect J12 to the [FADJ] side.
- Turn the power switch off and then turn it on again.

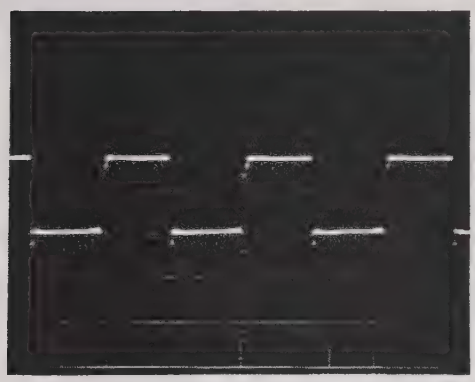


Fig. 3-90 Waveform at ⓫

(d) Checking DS-1C

Set-up as shown in Fig. 3-88.

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-1C
FRAME	:	FRAMED
PATTERN	:	PRBS
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	DS-1C
FRAME	:	FRAMED
PATTERN	:	PRBS
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❹ using an oscilloscope probe.

The waveform shown in Fig. 3-91 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J7 to ❹.

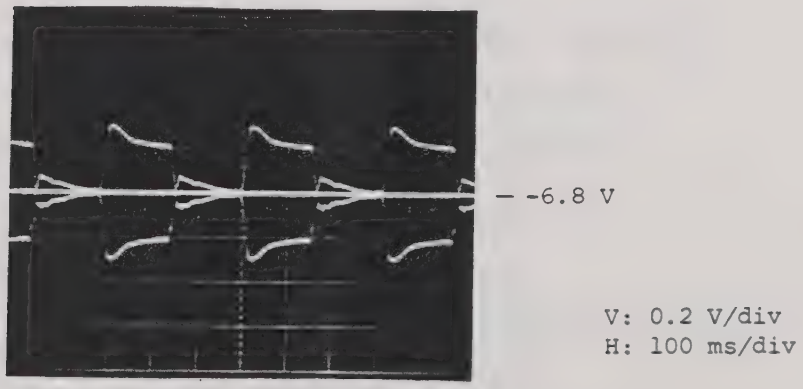


Fig. 3-91 Waveform at ❹

[Step 2]

Check the waveform at ⓫ using an oscilloscope probe.

The waveform shown in Fig. 3-92 is normal.

Also, remove the cable connected to DS-1/1C/2 INPUT and check the frequency at ⓫ using a frequency counter.

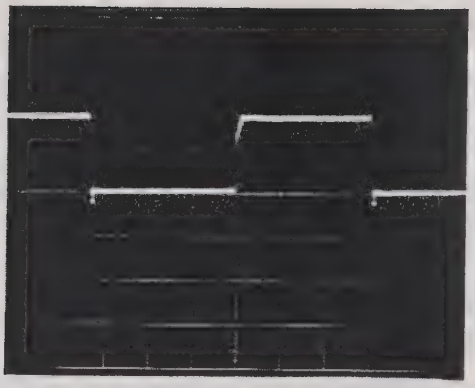
A frequency of 3.120 to 3.183 MHz is normal.

If it is normal, check other items.

If it is abnormal, make the following adjustment.

Adjustment

1. Adjust R169 so that the waveform at ⓫ is as shown in Fig. 3-92.
2. Adjust the frequency at ⓫ using the following procedure.
   - Remove the cable connected to DS-1/1C/2 INPUT.
   - Connect J12 to the [FSET] side.
   - Adjust R166 so that the frequency at ⓫ is 3.120 to 3.183 MHz.
   - Connect J12 to the [FADJ] side.
   - Turn the power switch off and then turn it on again.



V: 2 V/div
H: 50 ns/div

Fig. 3-92 Waveform at ⑪

(e) Checking DS-1

Set-up as shown in Fig. 3-88.

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-1
FRAME	:	FRAMED, D4
PATTERN	:	PRBS
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	DS-1
FRAME	:	FRAMED, D4
PATTERN	:	PRBS
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❸ using an oscilloscope probe.

The waveform shown in Fig. 3-93 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J7 to ❸.

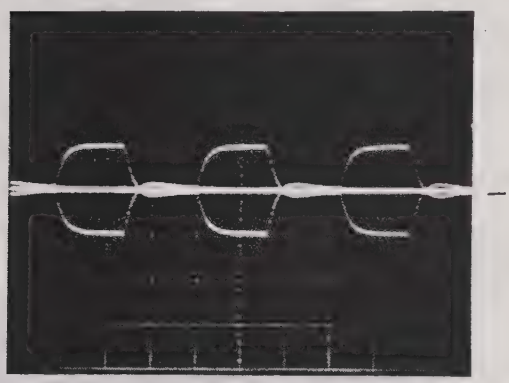


Fig. 3-93 Waveform at ❸

[Step 2]

Check the waveform at ⓫ using an oscilloscope probe.

The waveform shown in Fig. 3-94 is normal.

Also, remove the cable connected to DS-1/1C/2 INPUT and check the frequency at ⓫ using a frequency counter.

A frequency 1.528 to 1.559 MHz is normal.

If it is normal, check the other items.

If it is abnormal, make the following adjustment.

Adjustment

1. Adjust R176 so that the waveform at ⓫ is as shown in Fig. 3-94.
2. Adjust the frequency at ⓫ using the following procedure.
   - Remove the cable connected to DS-1/1C/2 INPUT.
   - Connect J12 to the [FSET] side.
   - Adjust R180 so that the frequency at ⓫ is 1.528 to 1.559 MHz.
   - Connect J12 to the [FADJ] side.
   - Turn the power switch off and then turn it on again.

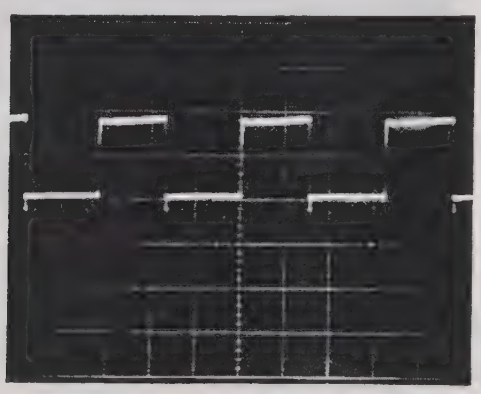


Fig. 3-94 Waveform at ⓫

(f) Checking unipolar

Set-up as shown in Fig. 3-95.

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-3
FRAME	:	FRAMED
PATTERN	:	PRBS
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
UNIPOLAR OUTPUT LEVEL (Rear panel)	:	+1/-1 V
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	UNIPOLAR
FRAME	:	FRAMED
PATTERN	:	PRBS
UNIPOLAR INPUT LEVEL (Rear Panel)	:	+1/-1 V
UNIPOLAR INPUT MODE (Rear Panel)	:	FUNCTION SWITCH A1, A2: "0"
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

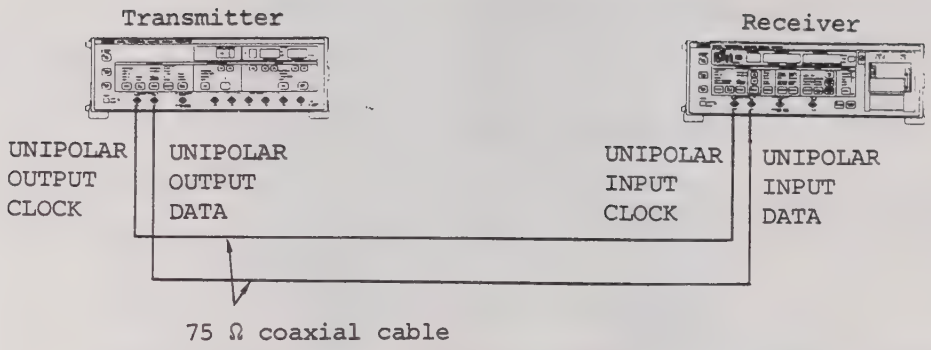

Transmitter
Receiver
UNIPOLAR OUTPUT CLOCK
UNIPOLAR OUTPUT DATA
UNIPOLAR INPUT CLOCK
UNIPOLAR INPUT DATA
75 Ω coaxial cable
Use a 75 Ω coaxial of the same length for the transmitter and receiver.

Fig. 3-95 Setup

[Step 1]

Check the waveform at ⓮ using an oscilloscope.

The waveform shown in Fig. 3-96 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R70 so that the waveform at ⓮ is as shown in Fig. 3-96.

Note:

If the input level is TTL, adjust R69.
If it is ECL, adjust R73.

If the waveform is abnormal after the adjustment has been made, troubleshoot the circuits related to J6 to ⓮.

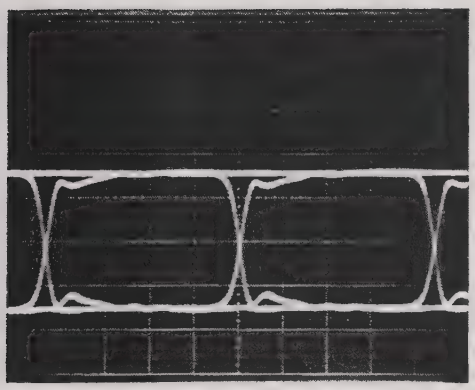


Fig. 3-96 Waveform at ⓮

[Step 2]

Check the waveform at ⓯ using an oscilloscope.

The waveform shown in Fig. 3-97 is normal.

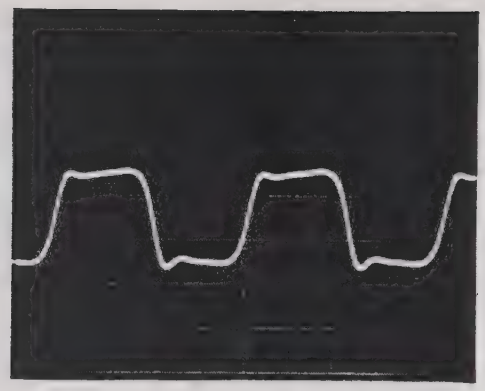
If it is normal, check the other items.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R107 so that the waveform at ⓯ is as shown in Fig. 3-97.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J5 to ⓯.



V: 0.5 V/div
H: 5 ns/div

Fig. 3-97 Waveform at ⑮

(g) Checking control signal

Receiver panel setting

INPUT	:	DSX-1 H/L
FRAME	:	FRAMED
PATTERN	:	PRBS
DEMUX	:	OFF
ERROR	:	BIT
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the voltages at ㉙ using an oscilloscope.

The voltages shown in Table 3-13 are normal.

If they are normal, the control signal is normal.

If they are abnormal, troubleshoot the circuits related to J3 to ㉙.

Table 3-13 Voltages at ㉙

Measurement point	Voltages at ㉙
Q96-4	H
Q96-3	H
Q96-2	L
Q96-1	L
Q96-40	L
Q96-39	L
Q96-38	H
Q96-37	L
Q96-18	H
Q96-19	H
Q96-20	H
Q96-21	H
Q96-22	H
Q96-23	L
Q96-24	L
Q96-25	L
Q96-14	H
Q96-15	H
Q96-16	H

H: +2 to +5 V
L: +0.5 V or less

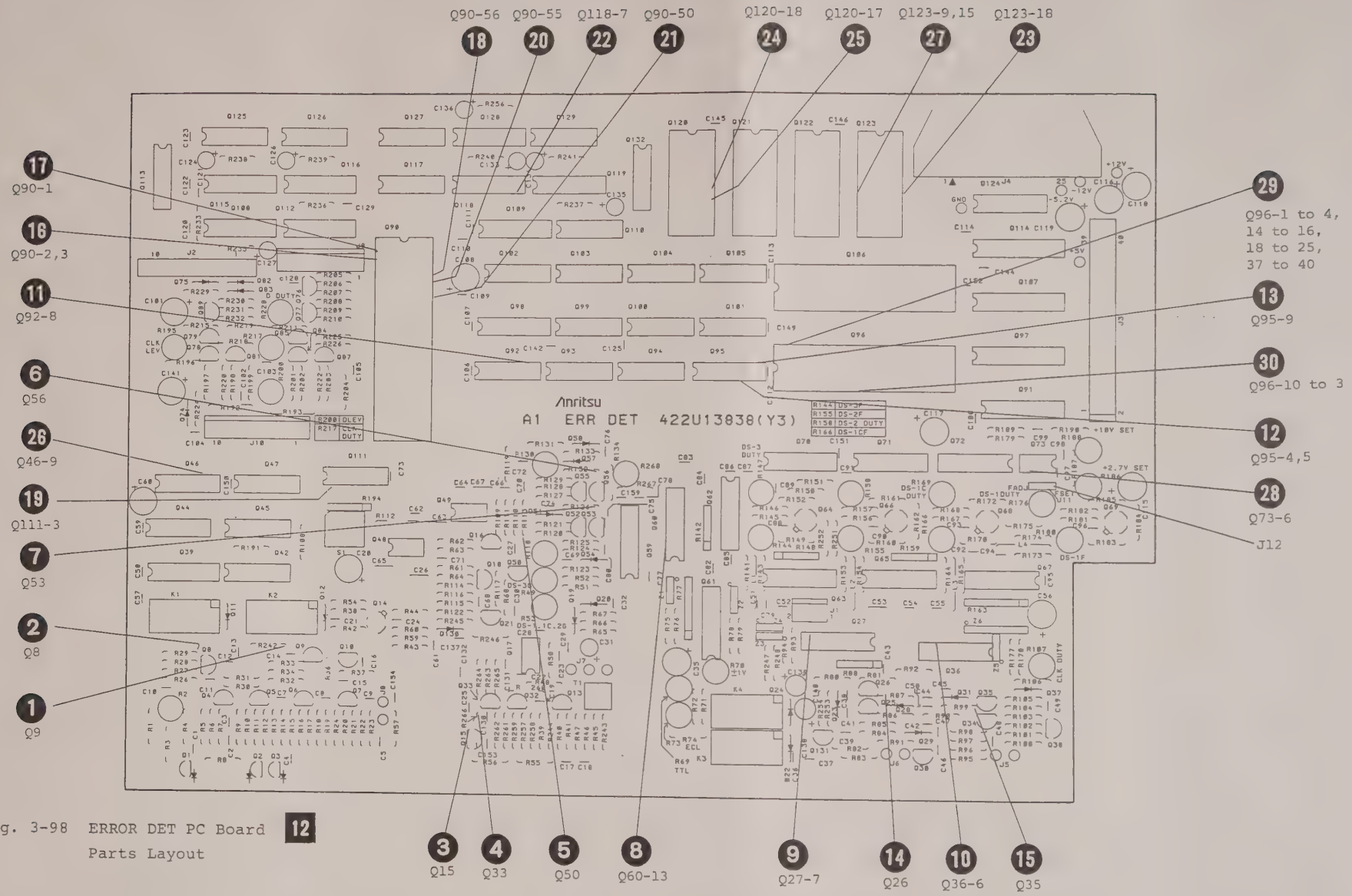
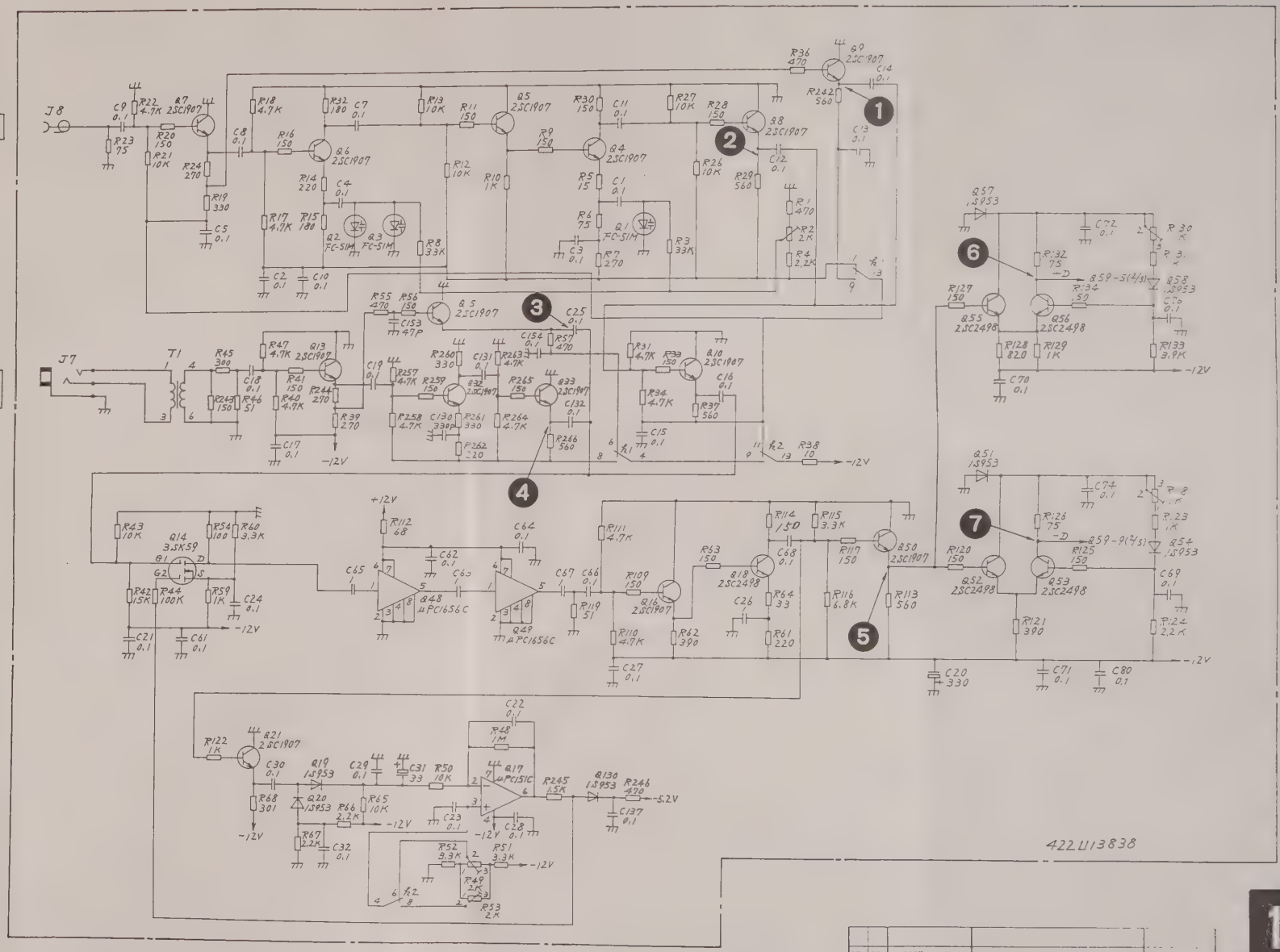


Fig. 3-98 ERROR DET PC Board 12
Parts Layout

APPLICATION

REVISIONS



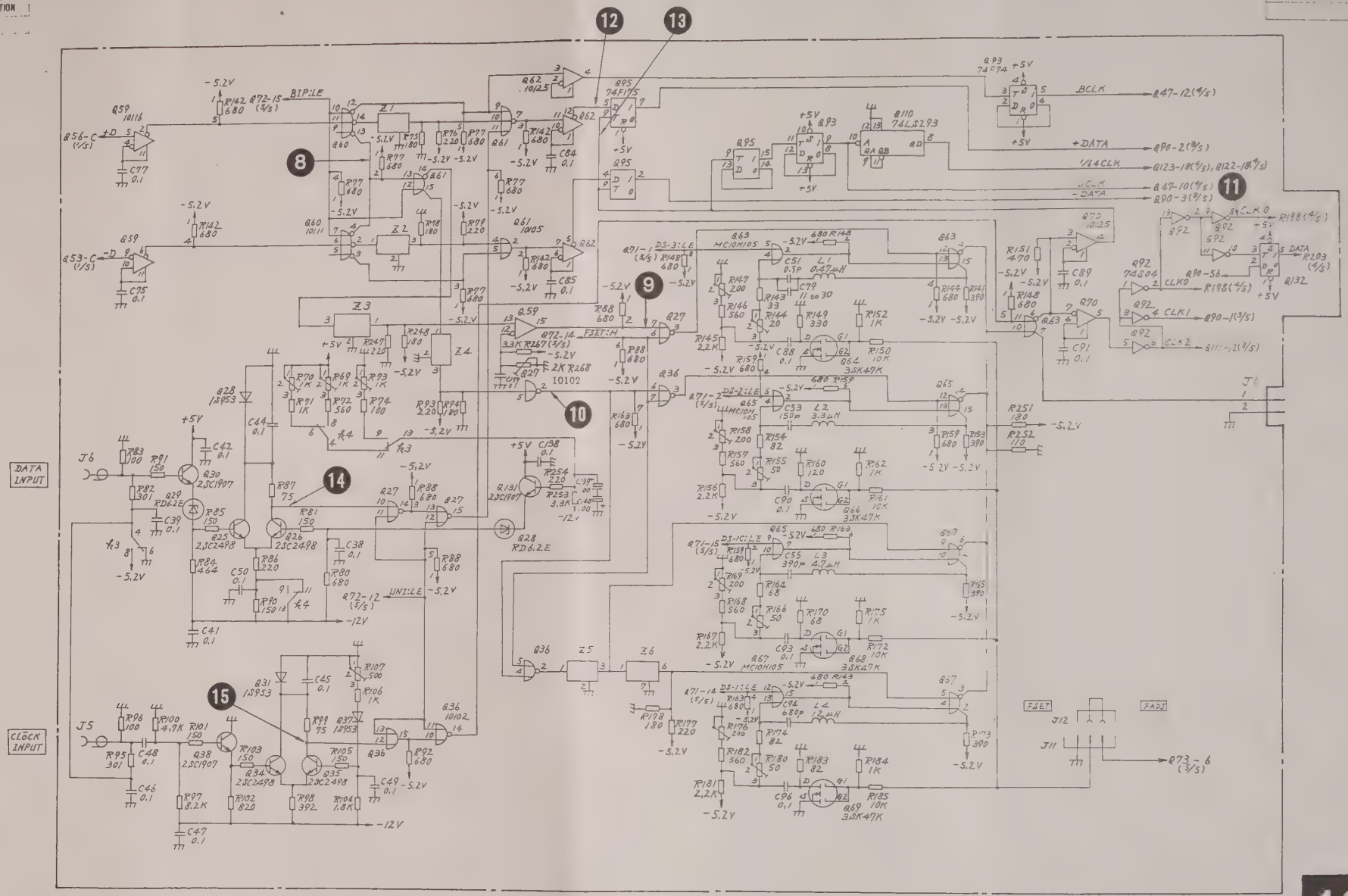
Parts List 44W88390

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN
CHECKED BY	F. Ishii	TRACED BY		SCALE	M-2
APPROVED BY	E. Sugimoto	DRAWN BY	T. Kubota		
TITLE	A1 ERROR DET Circuit Diagram. Recever.			DRAWING No.	43W3502-1/5

12

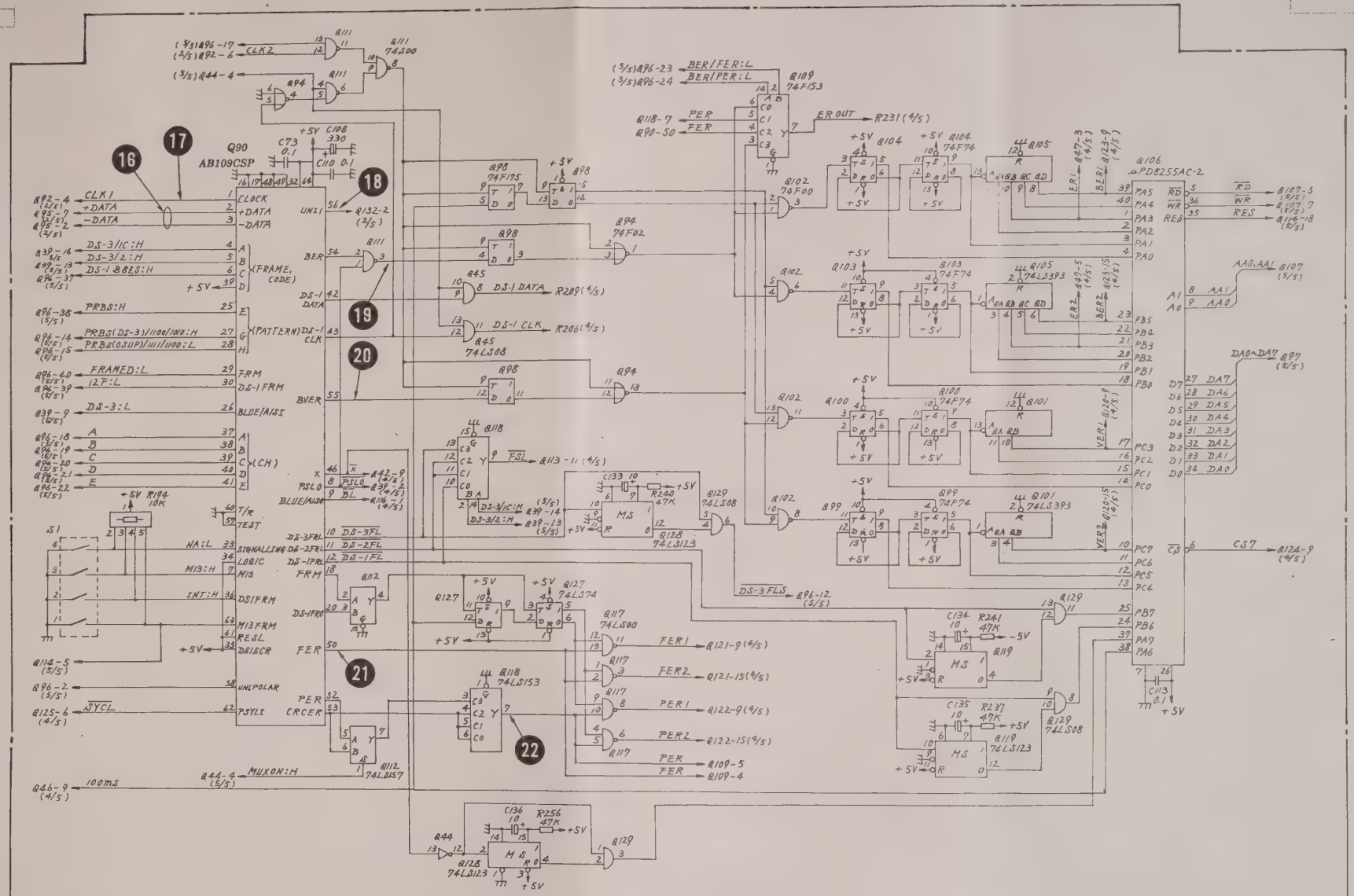
OEP

ANRITSU CORP 3-169/3-170


APPLICATION
REVISIONS
DATA INPUT
CLOCK INPUT
J6
J5
J7
J12
J11
FSET
FADJ
BIP:LE
UNI:LE
FSET:H
BCLK
+DATA
1/4CLK
-DATA
CLK0
CLK1
CLK2
DATA
Q132
Q47-12(4/5)
Q90-2(3/5)
Q123-18(4/5), Q122-18(4/5)
Q47-10(4/5)
Q90-3(3/5)
Q198(4/5)
Q203(4/5)
Q90-1(3/5)
Q111-12(3/5)
Q73-6(3/5)
Q72-15(5/5)
Q72-12(5/5)
Q72-14(5/5)
Q71-1(5/5)
Q71-2(5/5)
Q71-15(5/5)
Q71-14(5/5)
Q56-C(1/5)
Q53-C(1/5)
-5.2V
-12V
+5V
+DATA
-DATA
CLK0
CLK1
CLK2
DATA
FSET
FADJ
BCLK
1/4CLK
UC-K
Z1
Z2
Z3
Z4
Z5
Z6
Q59 10116
Q60 10111
Q61 10051
Q62 10125
Q63 MC10H105
Q64 3SK47K
Q65 MC10H105
Q66 3SK47K
Q67 MC10H105
Q68 3SK47K
Q69 3SK47K
Q70 10125
Q92 74S04
Q93 74F74
Q95 74F175
Q110 74LS293
Q27 10102
Q36 10102
Q28 1SR93
Q31 1SR93
Q37 1SR93
Q29 RD6.2E
Q28 RD6.2E
Q30 2SC1907
Q38 2SC1907
Q25 2SC2498
Q26 2SC2498
Q34 2SC2498
Q35 2SC2498
Q13 2SC1907
DS-3:LE
DS-2:LE
DS-1C:LE
DS-1:LE
CLKO
CLK1
CLK2
R142 680
R77 680
R78 680
R79 220
R248 180
R247 220
R88 680
R87 75
R81 150
R80 680
R86 220
R84 464
R85 150
R82 301
R83 100
R91 150
R90 150
R92 680
R93 220
R94 180
R70 1K
R69 1K
R71 1K
R72 560
R73 1K
R74 100
R107 500
R106 1K
R96 100
R100 4.9K
R101 150
R95 301
R97 8.2K
R102 820
R98 392
R103 150
R105 150
R104 1.8K
R99 75
R147 200
R146 560
R145 2.2K
R148 680
R143 33
R144 20
R149 330
R152 1K
R150 10K
R151 470
R153 390
R154 82
R157 560
R156 2.2K
R158 200
R155 50
R160 120
R162 1K
R161 10K
R159 680
R163 680
R165 390
R167 200
R168 560
R167 2.2K
R164 68
R166 50
R170 68
R175 1K
R172 10K
R173 390
R176 200
R177 220
R178 180
R182 560
R181 2.2K
R174 82
R180 50
R183 82
R184 1K
R185 10K
R251 180
R252 110
C51 0.5P 0.47μH
C53 150P 3.3μH
C55 390P 4.7μH
C94 680P 12μH
C79 11 to 30
C88 0.1
C89 0.1
C90 0.1
C91 0.1
C93 0.1
C96 0.1
C42 0.1
C44 0.1
C41 0.1
C39 0.1
C50 0.1
C38 0.1
C45 0.1
C49 0.1
C47 0.1
C48 0.1
C46 0.1
C77 0.1
C75 0.1
C84 0.1
C85 0.1
C254 220
C253 3.3K
C138 0.1
C139 100
C140 1.00
R268 2K
R267 3.3K
R253 3.3K
R254 220
R88 680
R163 680
R198 180
R177 220
R181 2.2K
R183 680
R159 680
R165 390
R173 390
R153 390
R141 390
R144 680
R148 680
R143 680
R163 680
R159 680
R155 680
R151 470
R252 110
R251 180
R203 (4/5)
R198(4/5)
R198(4/5)
R132
R111-12(3/5)
R73-6(3/5)
R90-56
R90-1(3/5)
R90-3(3/5)
R90-2(3/5)
R47-10(4/5)
R47-12(4/5)
R123-18(4/5), R122-18(4/5)
R90-2(3/5)
R90-3(3/5)
R47-12(4/5)
R90-1(3/5)
R111-12(3/5)
R73-6(3/5)
R132
R203 (4/5)
R198(4/5)
R198(4

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN

CHECKED BY F Sugata | TRACED BY | SCALE

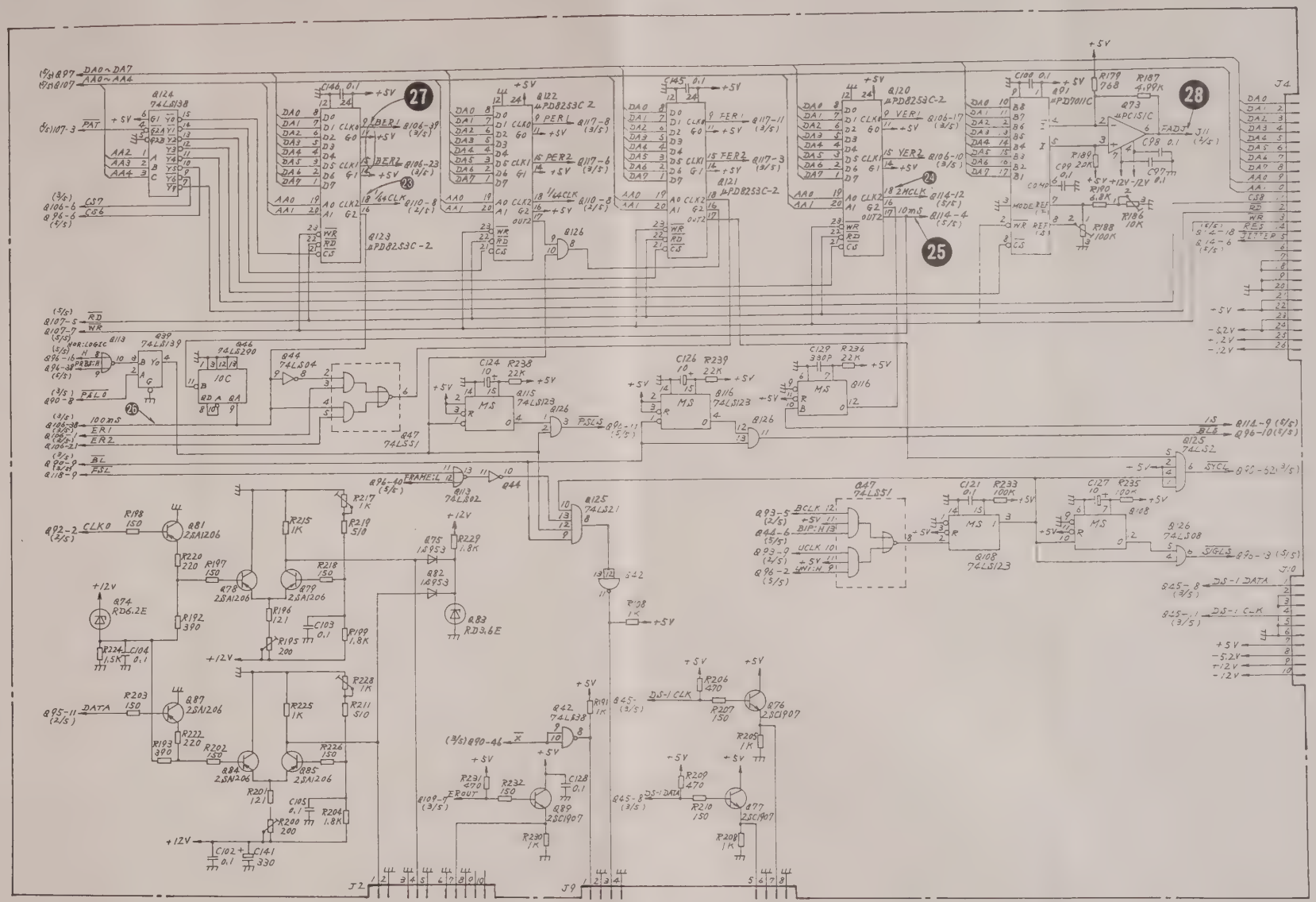
APPROVED BY E Sugimoto | DRAWN BY T Kubota

TITLE A1 ERROR DET Circuit Diagram. (Receiver)

DRAWING No. 43W 36040 3/5

12

DEP



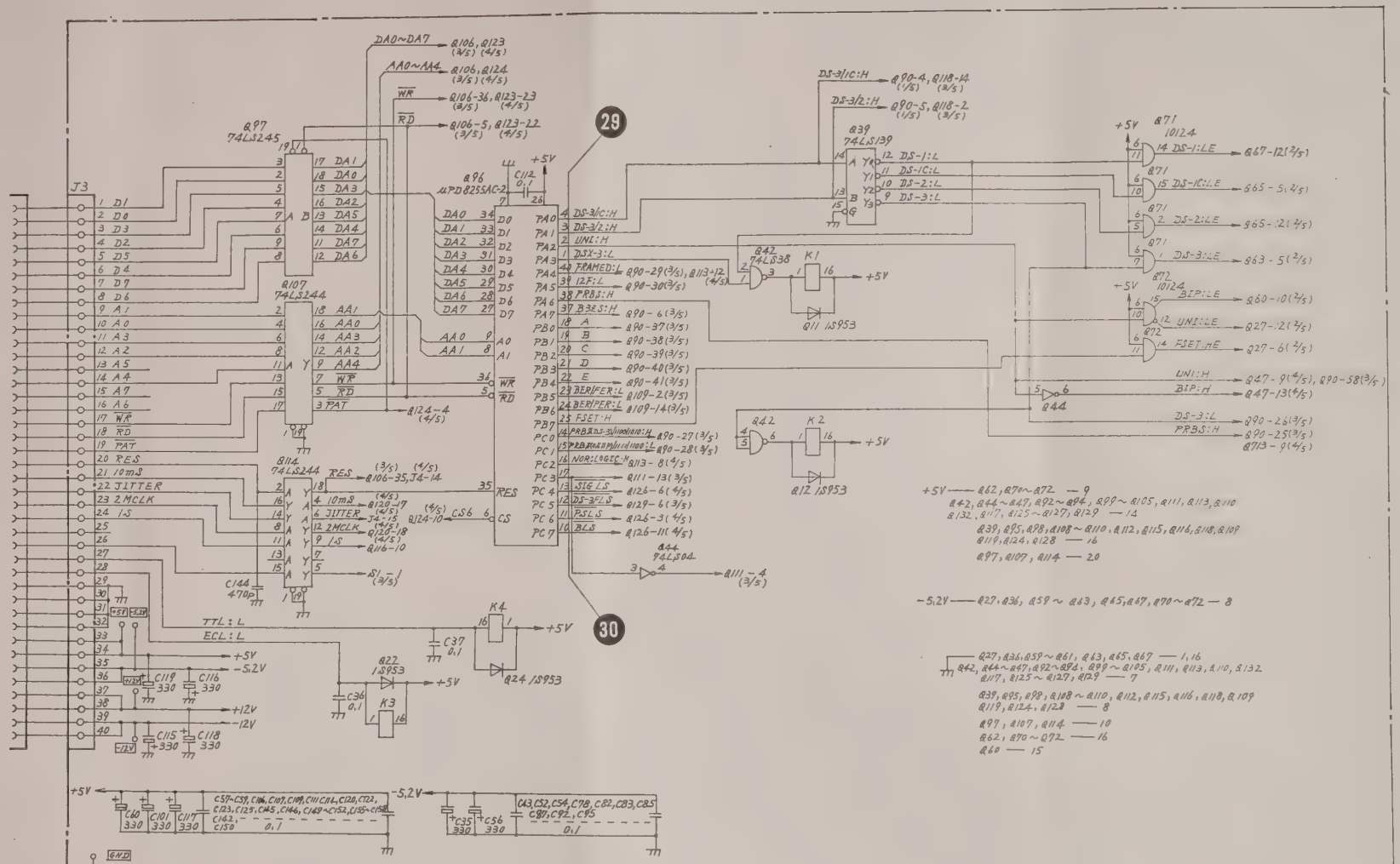
QTY	ITEM	PART No	DESCRIPTION	MATERIAL	F.N
CHECKED BY	E Sugimoto	TRACED BY		SCALE	
APPROVED BY	E Sugimoto	DRAWN BY	T Kubota		

TITLE: A1 ERROR DET Circuit Diagram. (Receiver)

DRAWING No. 43W3604 4/5

ANRITSU CORP. 3-175/3-176

12



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH
CHECKED BY	F Sugata	TRACED BY		SCALE	
APPROVED BY	E. Sugimoto	DRAWN BY	T. Kuboto		
TITLE	A1 ERROR DET Circuit Diagram. (Receiver)			DRAWING No.	43W 36040 5/5

12

DEP

3.6.4 A3 R-DISPLAY PC board 13

(1) Circuit description

The A3 R-DISPLAY circuit consists of a detection circuit of the front-panel switch status, and driver circuit for LEDs and the digital display.

(2) Troubleshooting and adjustment

[Step 1]

Check the waveforms at ❶ using an oscilloscope probe.

The waveforms shown in Fig. 3-99 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to Q1.

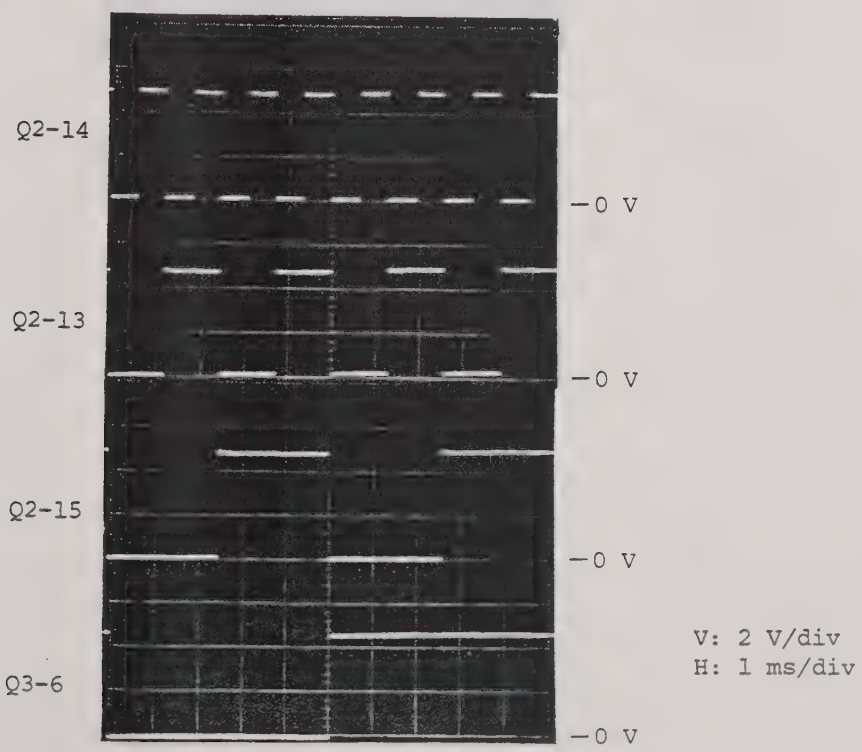


Fig. 3-99 Waveform at ❶

[Step 2]

Use an oscilloscope to check the waveform at ❷ when the [INPUT] key is pressed.

The waveform shown in Fig. 3-100 is normal.

If it is normal, A3 is normal.

If it is abnormal, troubleshoot the circuits related to Q2 and S4.

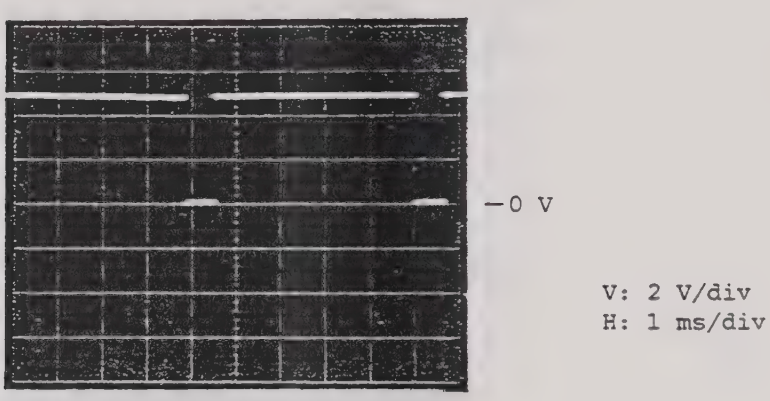


Fig. 3-100 Waveform at ❷

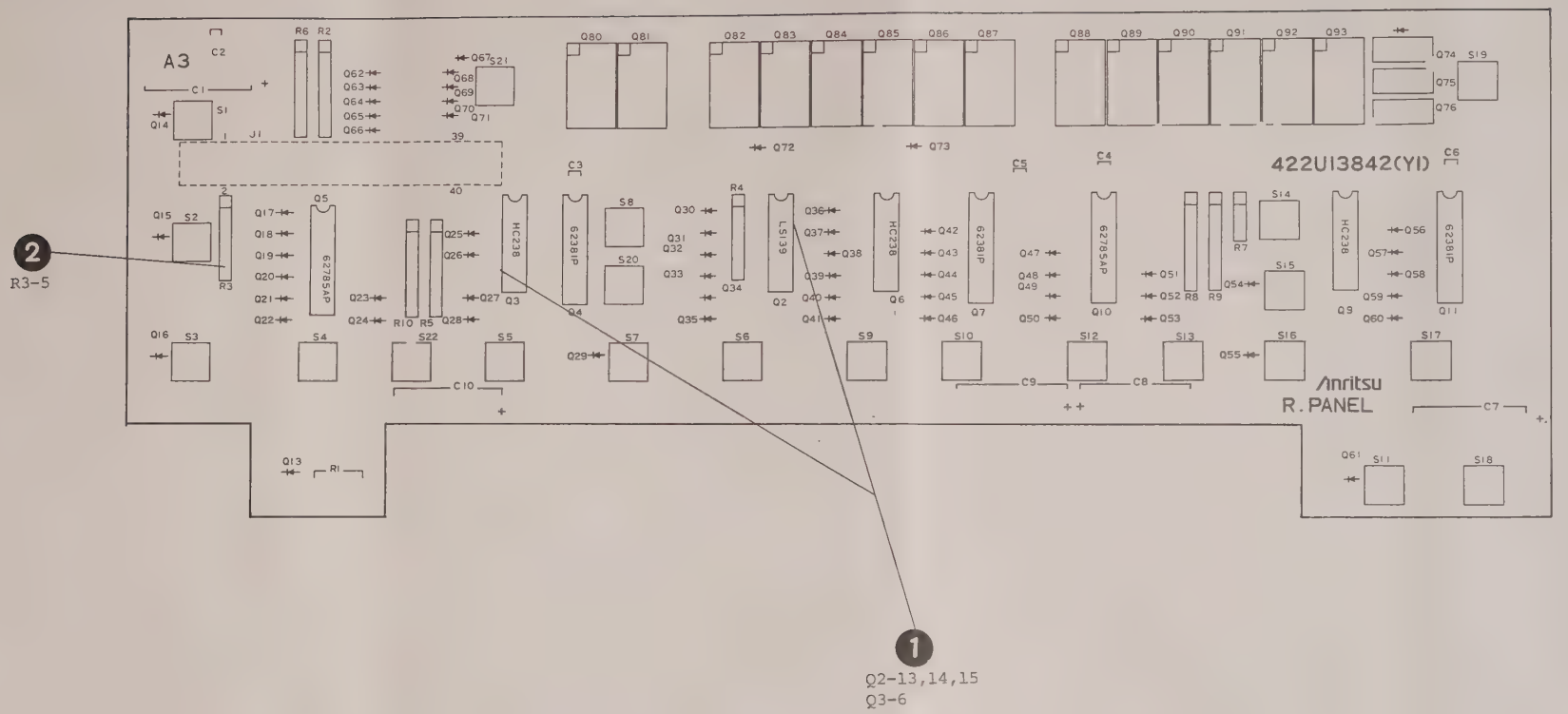
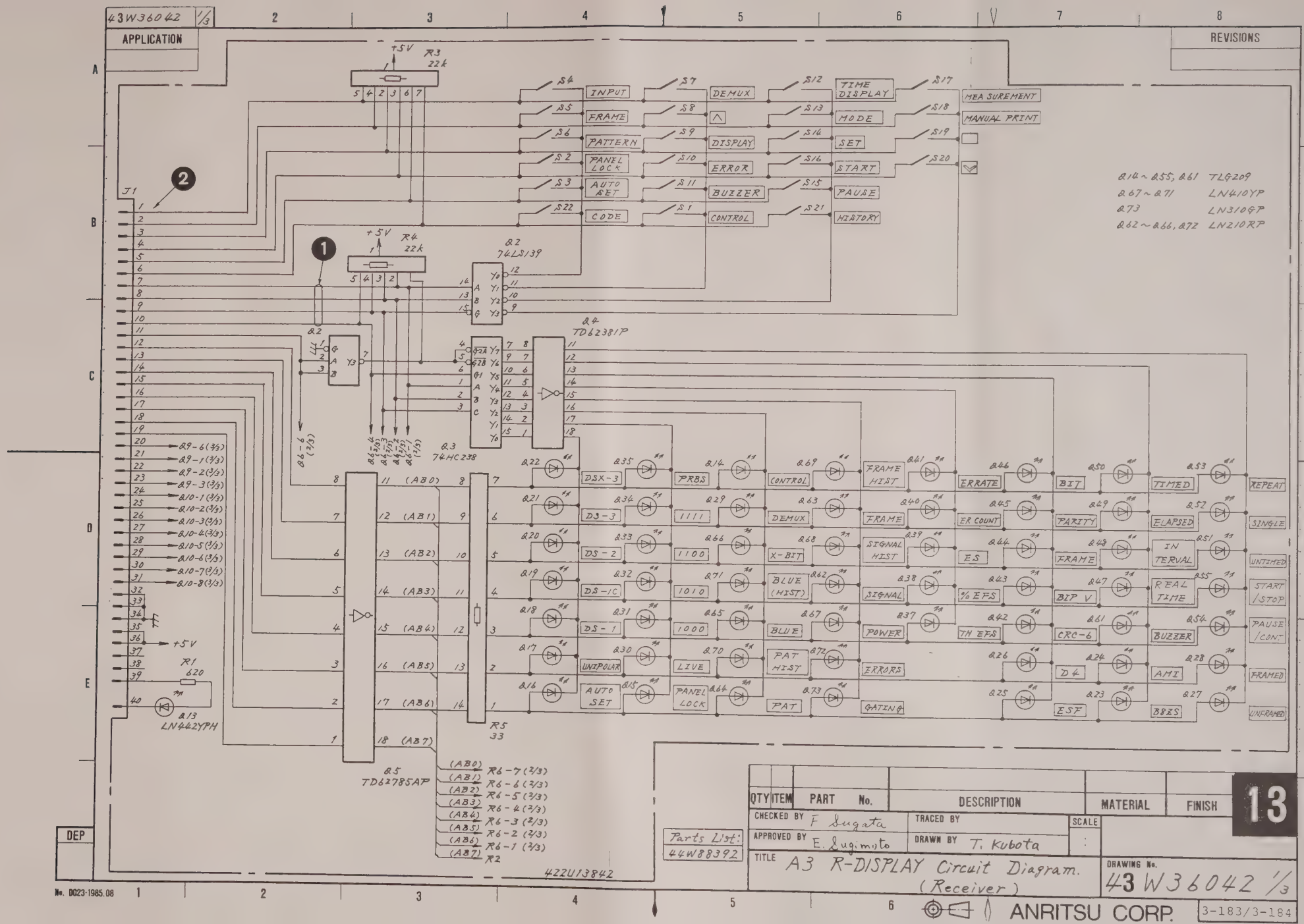


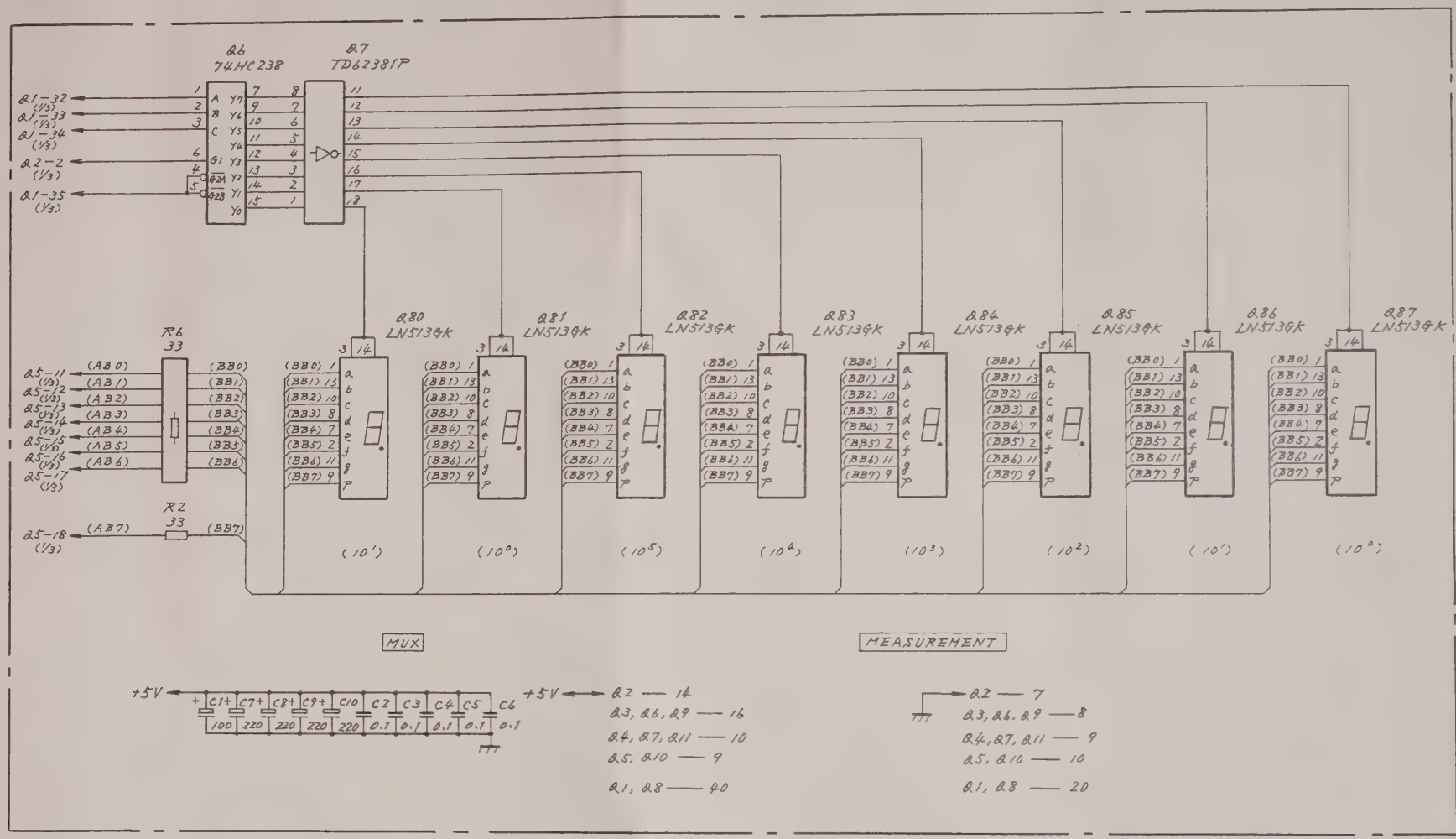
Fig. 3-101 R-DISPLAY PC Board 13
Parts Layout

(3-181 blank)/3-182


43W36042 1/3
APPLICATION
REVISIONS
+5V
R3 22k
R4 22k
R1 620
R5 33
J1
Q1 74LS139
Q2 74LS138
Q3 74HC238
Q4 TD62381P
Q5 TD62785AP
Q13 LN442YPH
S4 INPUT
S5 FRAME
S6 PATTERN
S2 PANEL LOCK
S3 AUTO SET
S22 CODE
S7 DEMUX
S8
S9 DISPLAY
S10 ERROR
S11 BUZZER
S1 CONTROL
S12 TIME DISPLAY
S13 MODE
S14 SET
S16 START
S15 PAUSE
S21 HISTORY
S17 MEASUREMENT
S18 MANUAL PRINT
S19
S20
Q14~Q55, Q61 TLG209
Q67~Q71 LN410YP
Q73 LN310GP
Q62~Q66, Q72 LN210RP
DSX-3
DS-3
DS-2
DS-1C
DS-1
UNIPOLAR
AUTO SET
PRBS
1111
1100
1010
1000
LIVE
PANEL LOCK
CONTROL
DEMUX
X-BIT
BLUE (HIST)
BLUE
PAT HIST
PAT
FRAME HIST
FRAME
SIGNAL HIST
SIGNAL
POWER
ERRORS
GATING
ERRATE
ER COUNT
ES
%EFS
TH EFS
D4
ESF
BIT
PARITY
FRAME
BIP V
CRC-6
BPES
TIMED
ELAPSED
INTERVAL
REAL TIME
BUZZER
AMI
B8ES
REPEAT
SINGLE
UNTIMED
START /STOP
PAUSE /CONT
FRAMED
UNFRAMED
422U13842
Parts List: 44W88392
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY F Sugata
APPROVED BY E. Sugimoto
TRACED BY
DRAWN BY T. Kubota
SCALE
TITLE A3 R-DISPLAY Circuit Diagram. (Receiver)
DRAWING No. 43W36042 1/3
13
No. 0023-1985.08
ANRITSU CORP.
3-183/3-184

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A3 R-DISPLAY Circuit Diagram (Receiver)

DRAWING No. 43W36042 2/3

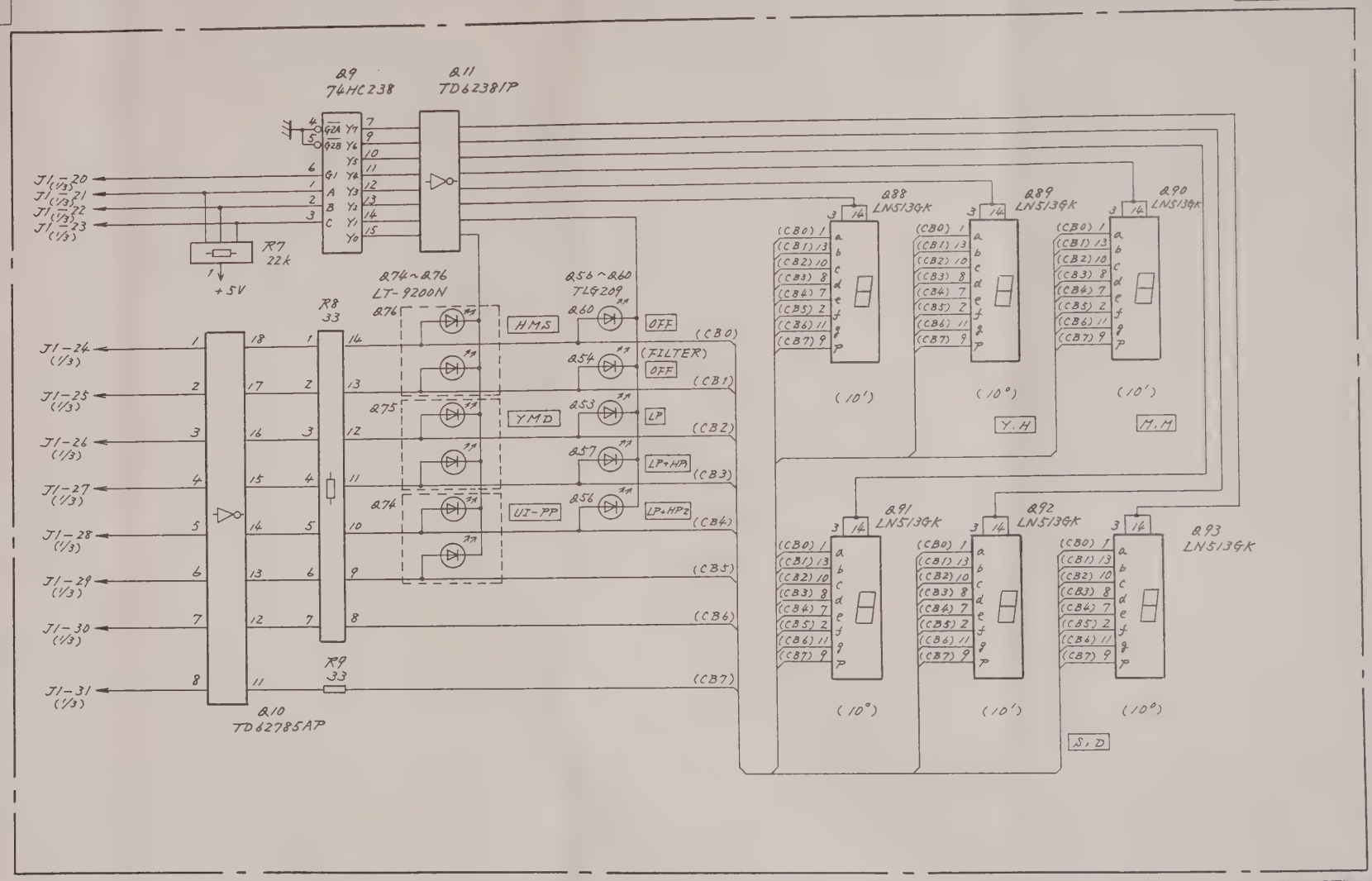
13

DEP

43W36042 3/3

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

13

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A3 R-DISPLAY Circuit Diagram. (Receiver)

DRAWING No. 43W36042 3/3

DEP

No. D023-1985.08

ANRITSU CORP.

3-187/3-188

3.6.5 JITTER MEASUREMENT PC board 14

(1) Circuit description

Figure 3-102 shows the block diagram of this circuit. The A5 JITTER MEASUREMENT circuit consists of a frequency division circuit, PD (phase-detection circuit), LPF circuit, VCXO circuit, filter circuit to limit the jitter frequency band, and jitter counting circuit.

This circuit has the same composition as the transmitter A4 JITTER MODULATION circuit.

The 1/N frequency division circuit divides the clock signal by when the jitter is 1 UIp-p or less, divides it by 12 when it is more than UIp-p at DS-3, and divides it by 10 at DS-1/1C/2.

The PD circuit detects the phase difference between the clock signal including the jitter and the reference clock signal.

The LPF circuit extracts the jitter signal.

The VCXO generates the reference clock signal.

The reference clock signal is generated by dividing the VCXO output signal by 12 for DS-1, by 6 for DS-1C, and by 4 for DS-2; It doubles it for DS-3.

Three filter circuits are available: an LP filter to limit the jitter frequency band; an LP filter + HP1 filter; and an LP filter + HP2 filter.

The counting circuit detects the amount of jitter and sends a pulse to display the jitter amount to the A2 T-CONTROL circuit. It also outputs the JITTER DEMOD signal.

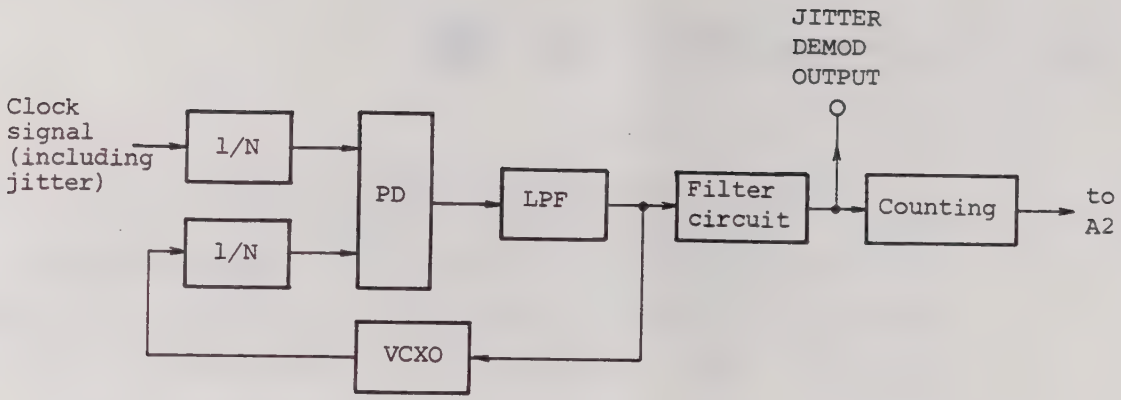


Fig. 3-102 A5 JITTER MEASUREMENT
Block Diagram

(2) Troubleshooting and adjustment

Transmitter panel setting

CLOCK	:	DS-3
JITTER MODULATION	:	MANUAL
FREQUENCY	:	500 Hz
AMPLITUDE	:	4 UIp-p

Receiver panel setting

INPUT	:	DSX-3
JITTER MEASUREMENT	:	OFF (FILTER)

Connection: Set-up as shown in Fig. 3-103.

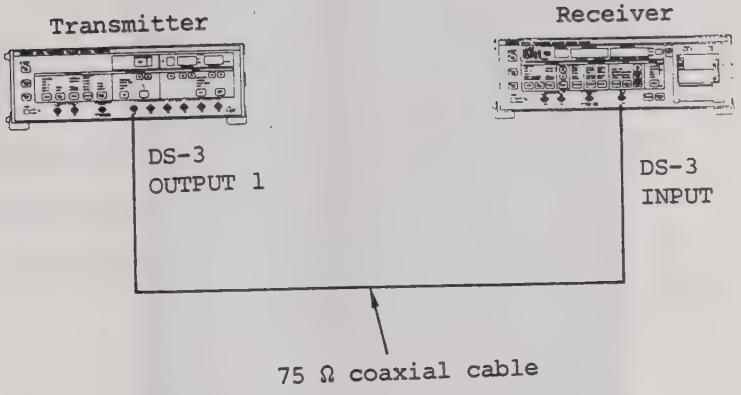


Fig. 3-103 Setup

[Step 1]

Check the waveform at ❶ using an oscilloscope probe.

The waveform shown in Fig. 3-104 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J2-1 to ❶.

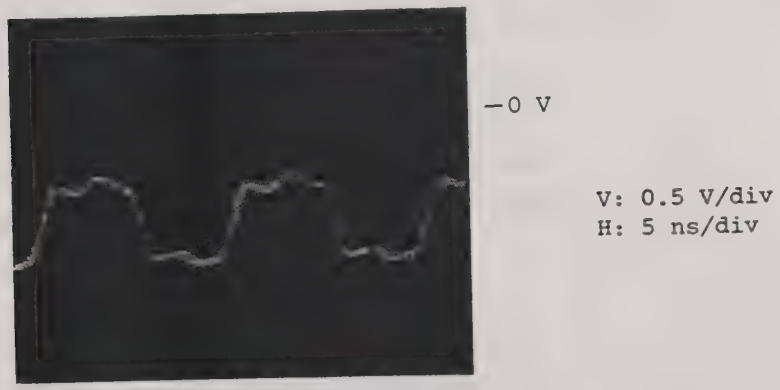


Fig. 3-104 Waveform at ❶

[Step 2]

Check the waveforms at ❷ using an oscilloscope. probe.

The waveforms shown in Fig. 3-105 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❶ to ❷.

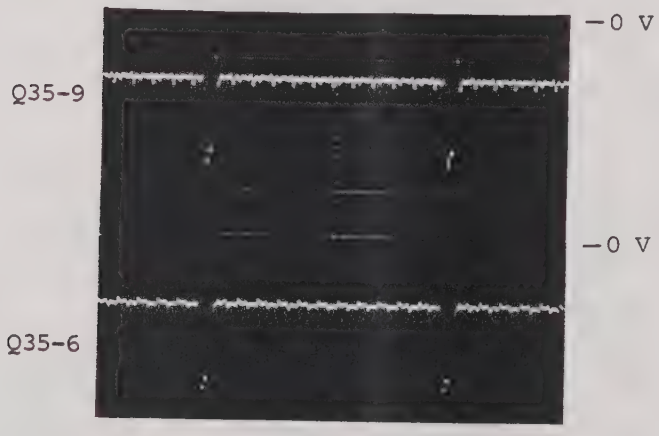


Fig. 3-105 Waveforms at ❷

[Step 3]

Check the waveform at ❸ and ❹ using an oscilloscope probe. The waveforms shown in Fig. 3-106 are normal. If they are normal, proceed to the next step. If they are abnormal, trouble-shoot the circuits related to ❷ to ❸ and Q45.

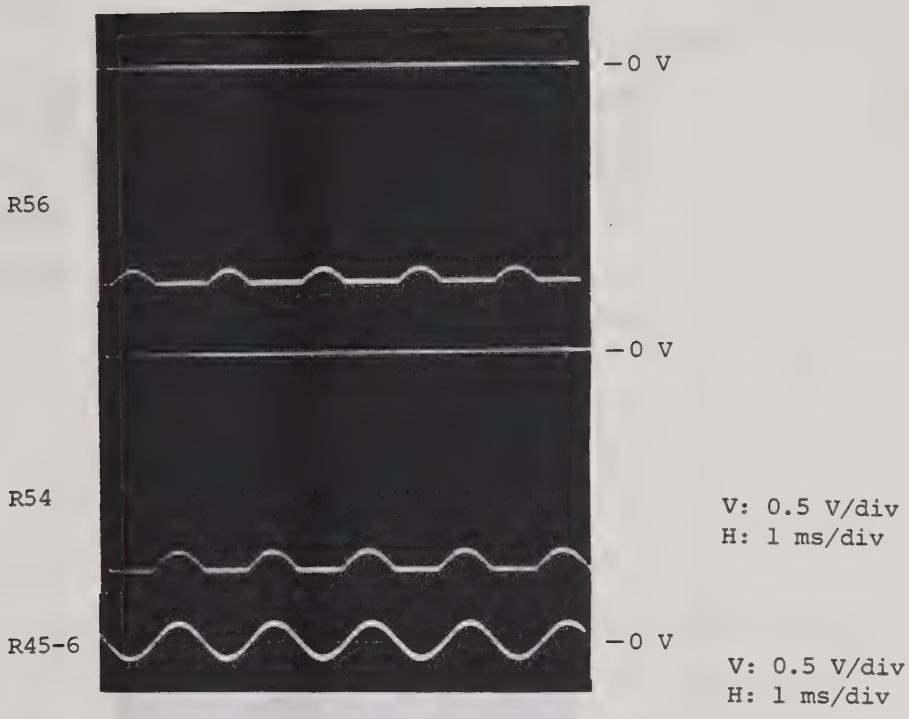


Fig. 3-106 Waveform at ❸ and ❹

[Step 4]

Check the waveform at ❺ using an oscilloscope.

The voltage shown in Fig. 3-107 is normal. If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❹ to ❺ .

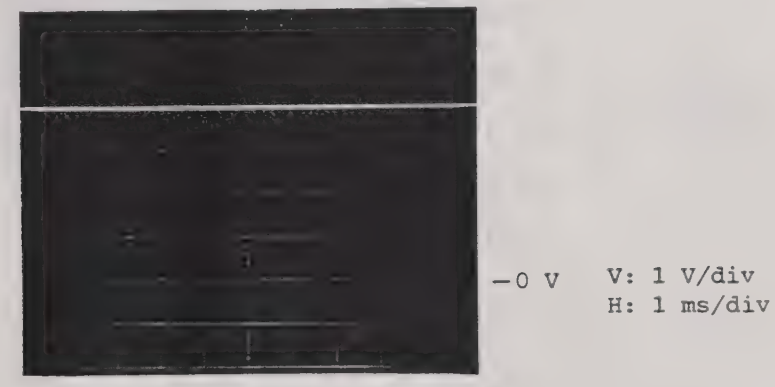


Fig. 3-107 Waveform at ❺

[Step 5]

Check the waveform at ❻ using an oscilloscope.

The waveform shown in Fig. 3-108 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❺ to ❻.

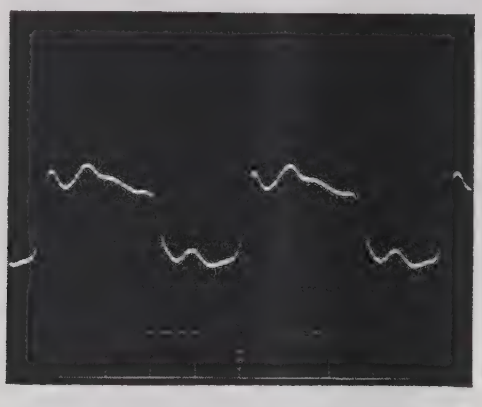


Fig. 3-108 Waveform at ❻

[Step 6]

Check the waveform at ❼ using an oscilloscope.

The waveform shown in Fig. 3-109 is normal.

Also, check the frequency at ❼ using a frequency counter.

A frequency of 44,736 MHz is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❻ to ❼.

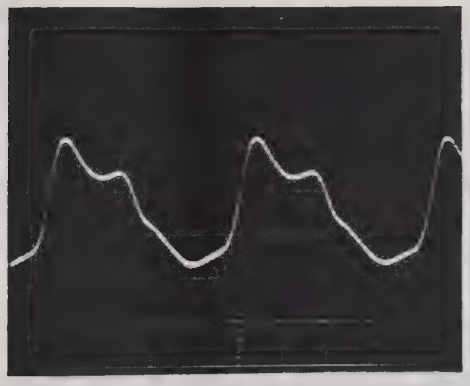


Fig. 3-109 Waveform at ❼

[Step 7]

Check the waveform at ❽ using an oscilloscope.

The waveform shown in Fig. 3-110 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❹ to ❽.

Fig. 3-110 Waveform at ❽

[Step 8]

Check the waveform at ❾ using an oscilloscope.

The waveform shown in Fig. 3-111 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❾.

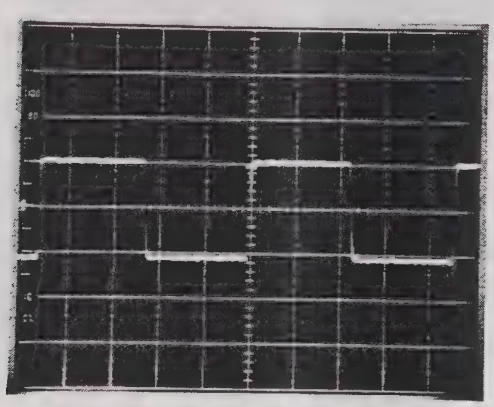


Fig. 3-111 Waveform at ❾

[Step 9]

Check the waveform at ❿ using an oscilloscope.

The waveform shown in Fig. 3-112 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❽ to ❿.

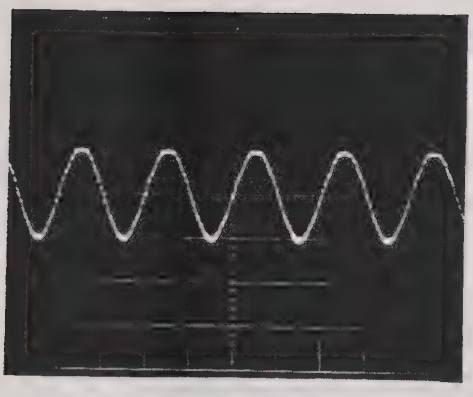


Fig. 3-112 Waveform at ⑩

[Step 10]

Check the waveform at ⑪ using an oscilloscope.

The waveform shown in Fig. 3-113 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Q31.

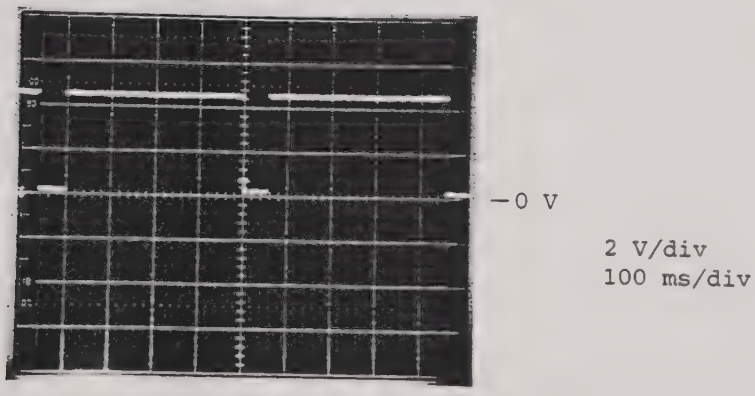


Fig. 3-113 Waveform at ⑪

[Step 11]

Check the voltage at ⑫ using an oscilloscope.

The voltages shown in Table 3-14 are normal.

If they are normal, A5 is normal. If they are abnormal, troubleshoot the circuits related to J1 to ⑫.

Table 3-14 Voltage at ⑫

Test point	Voltage
Q12-19	L
Q12-20	L
Q12-21	L
Q12-22	H
Q12-23	H
Q12-24	L
Q12-25	L

H: +2 V to +5 V

L: 0.5 V or less

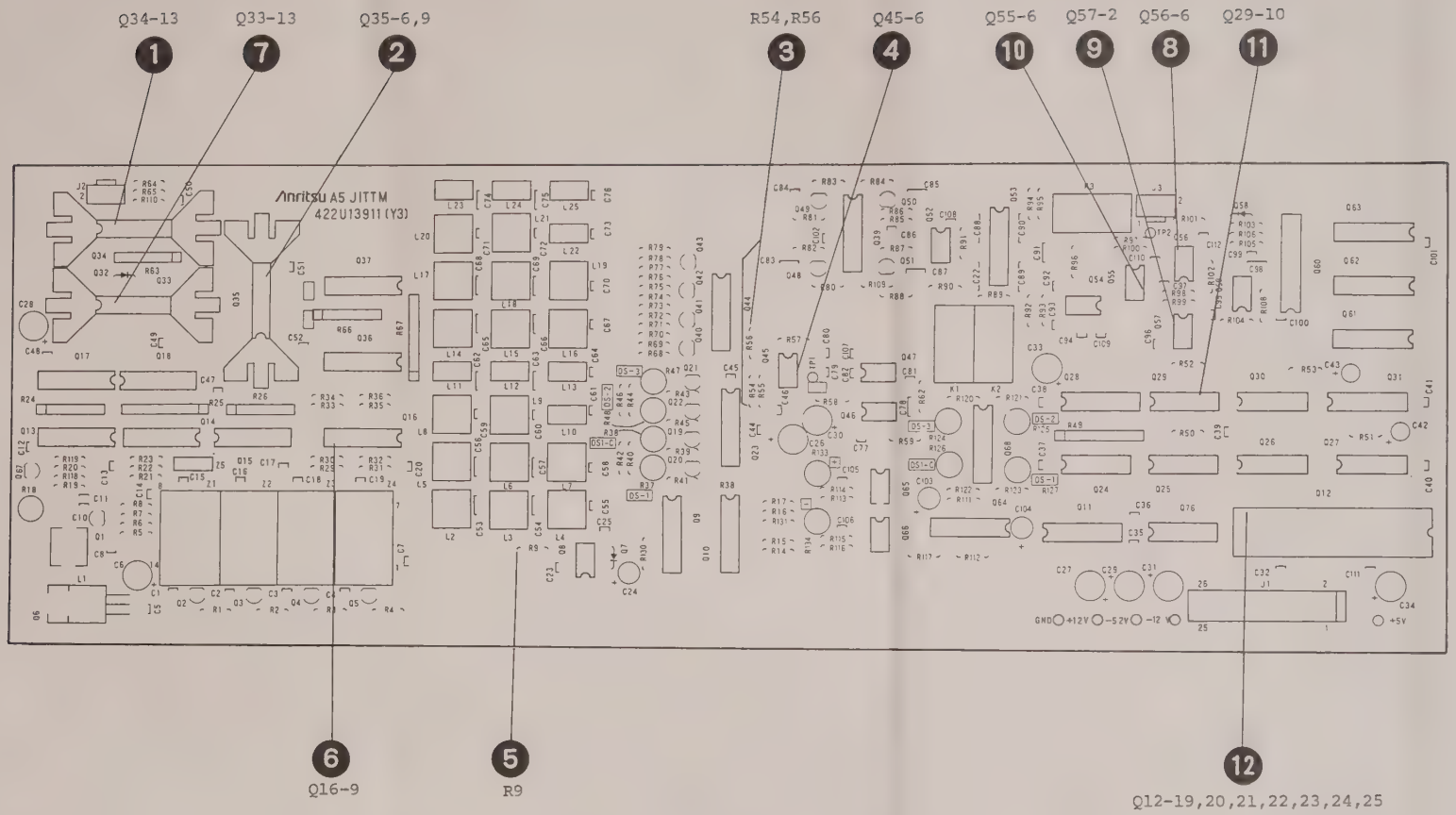
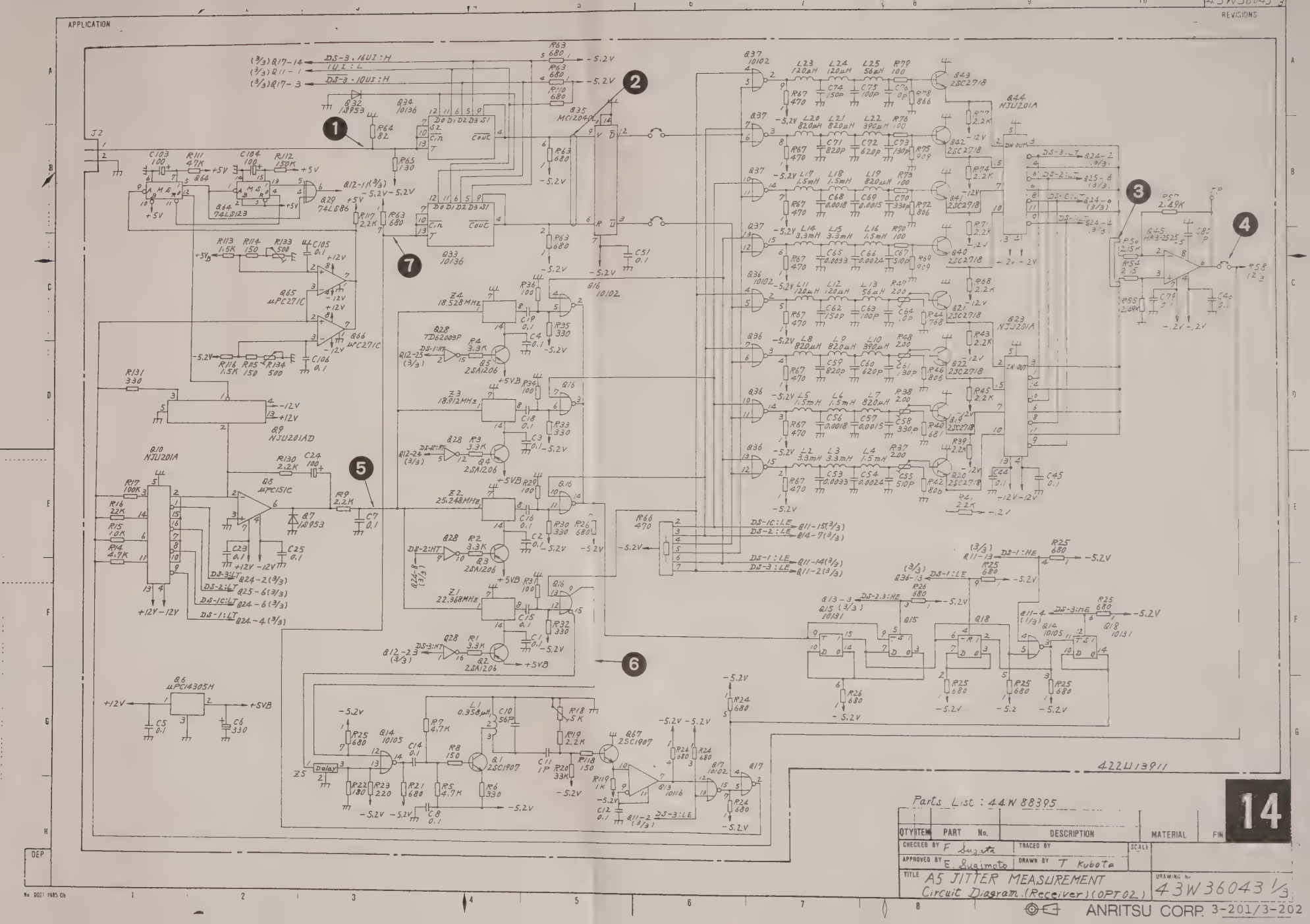
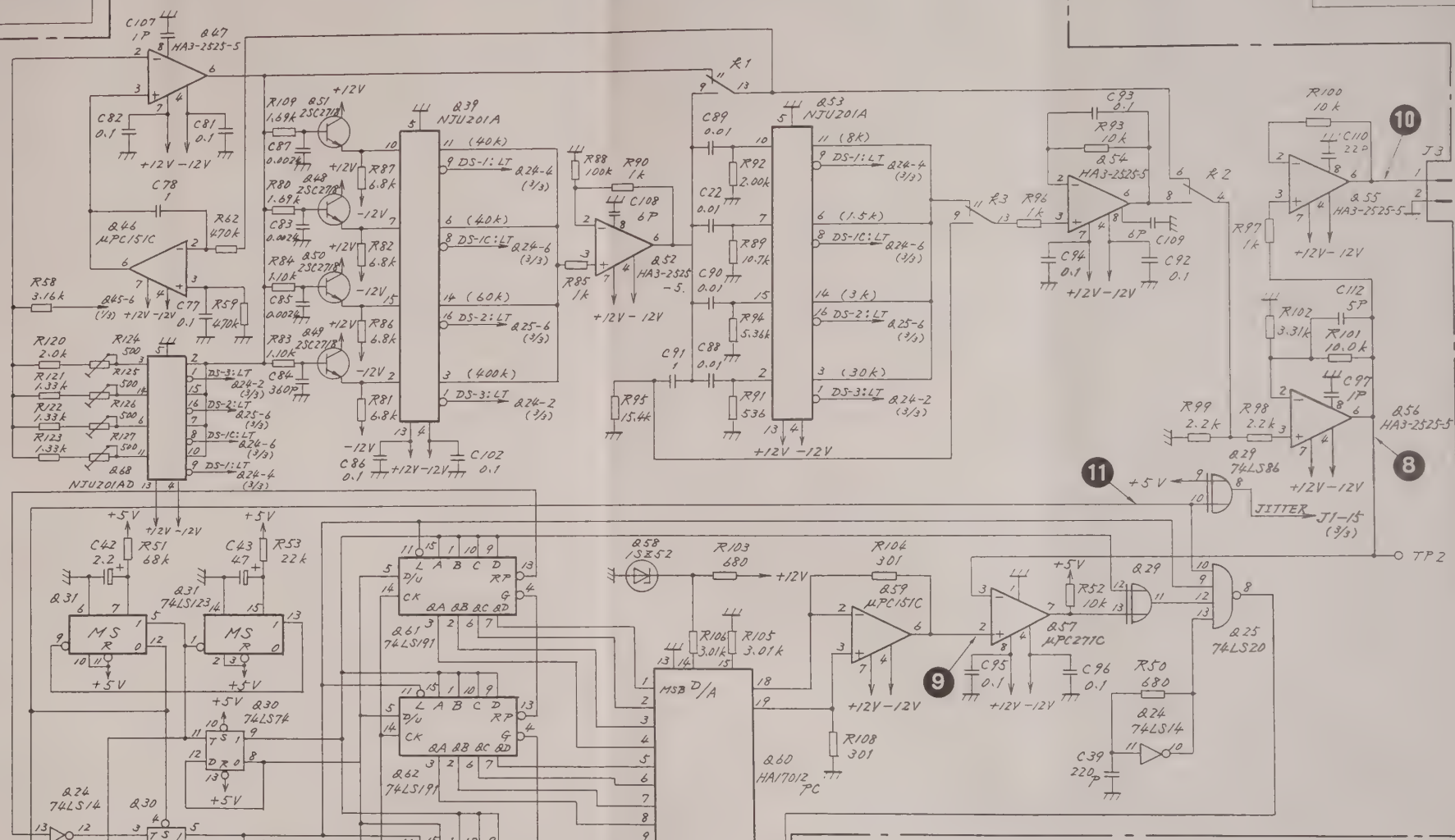


Fig. 3-114 JITTER MEASUREMENT PC Board 14
Parts Layout


APPLICATION
REVISIONS
Parts List : 44W88395
QTY ITEM PART No. DESCRIPTION MATERIAL FIN
CHECKED BY F Suzuta
TRACED BY
SCALE
APPROVED BY E Sugimoto
DRAWN BY T Kubota
TITLE A5 JITTER MEASUREMENT Circuit Diagram (Receiver) (OPT02)
DRAWING No 43W36043 1/3
ANRITSU CORP.
3-201/3-202
14
422W13911

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F Sugata | TRACED BY | SCALE : M-1

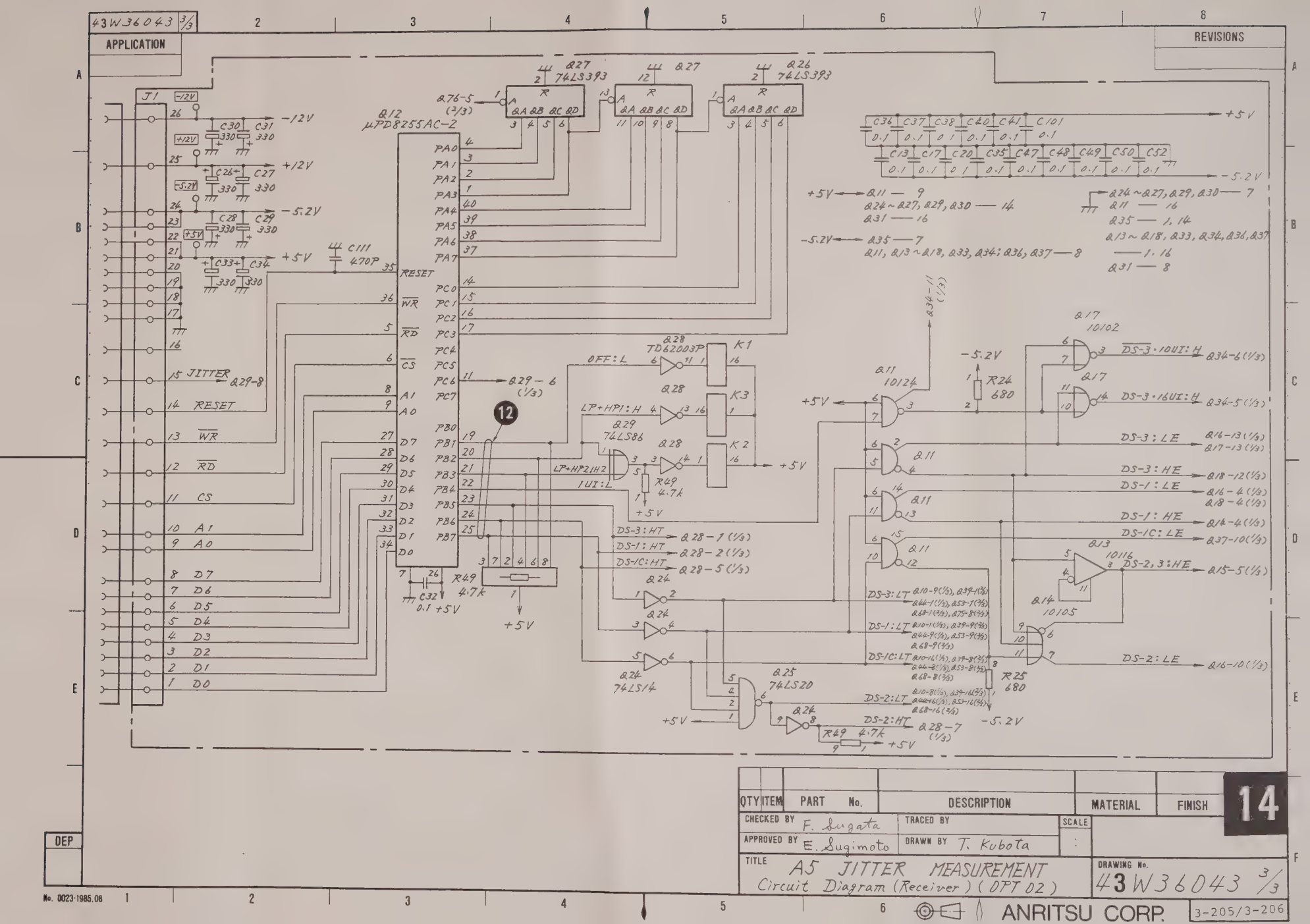
APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A5 JITTER MEASUREMENT Circuit Diagram (Receiver) (OPT 02)

DRAWING No. 43W36043 2/3

14

DEP



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A5 JITTER MEASUREMENT
Circuit Diagram (Receiver) (OPT 02)

DRAWING No. 43W36043 3/3

14

DEP

No. 0023-1985.08

ANRITSU CORP.

3-205/3-206

3.6.6 A4 R-SWITCH PC board 15, A8 PRINTER UNIT 16, PRINTER INTERFACE 17, PRINTER CONTROL 18 and A9 DS-1 OUTPUT 19

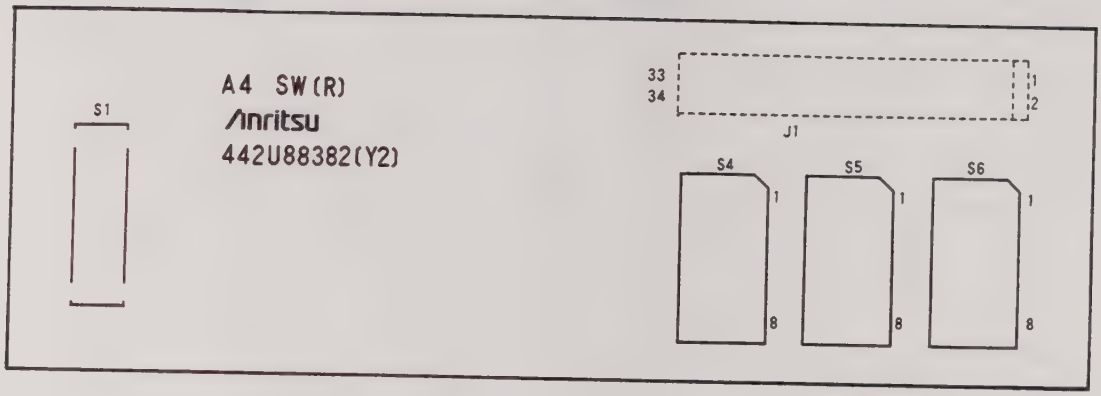
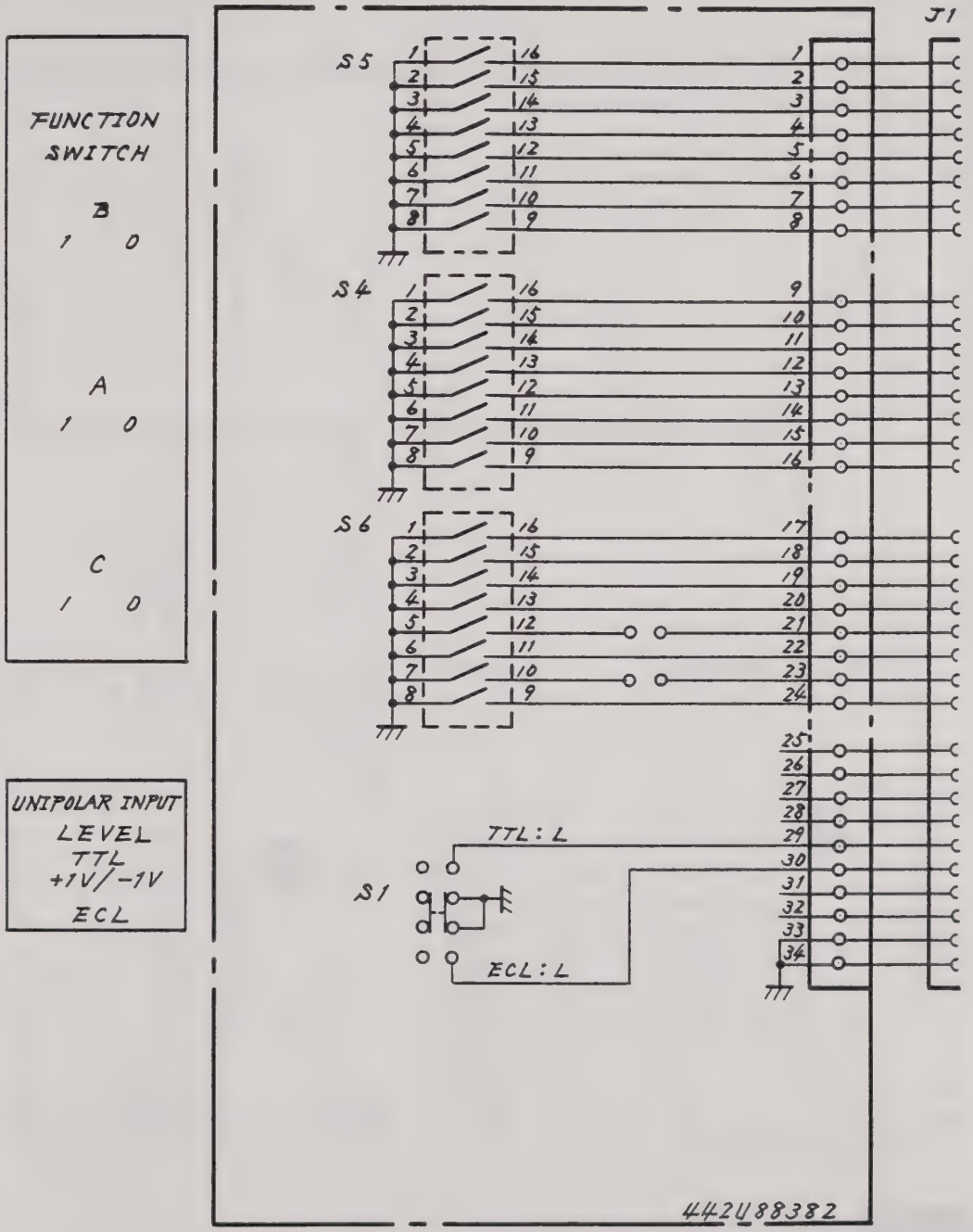


Fig. 3-115 R-SWITCH PC Board 15 Parts Layout

44W88393 1/1

APPLICATION

REVISIONS



Parts List 44W88394

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

15

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

DEP

TITLE A4 R-SWITCH Circuit Diagram (Receiver)

DRAWING No. 44W88393 1/1

No. 0025-1985.08

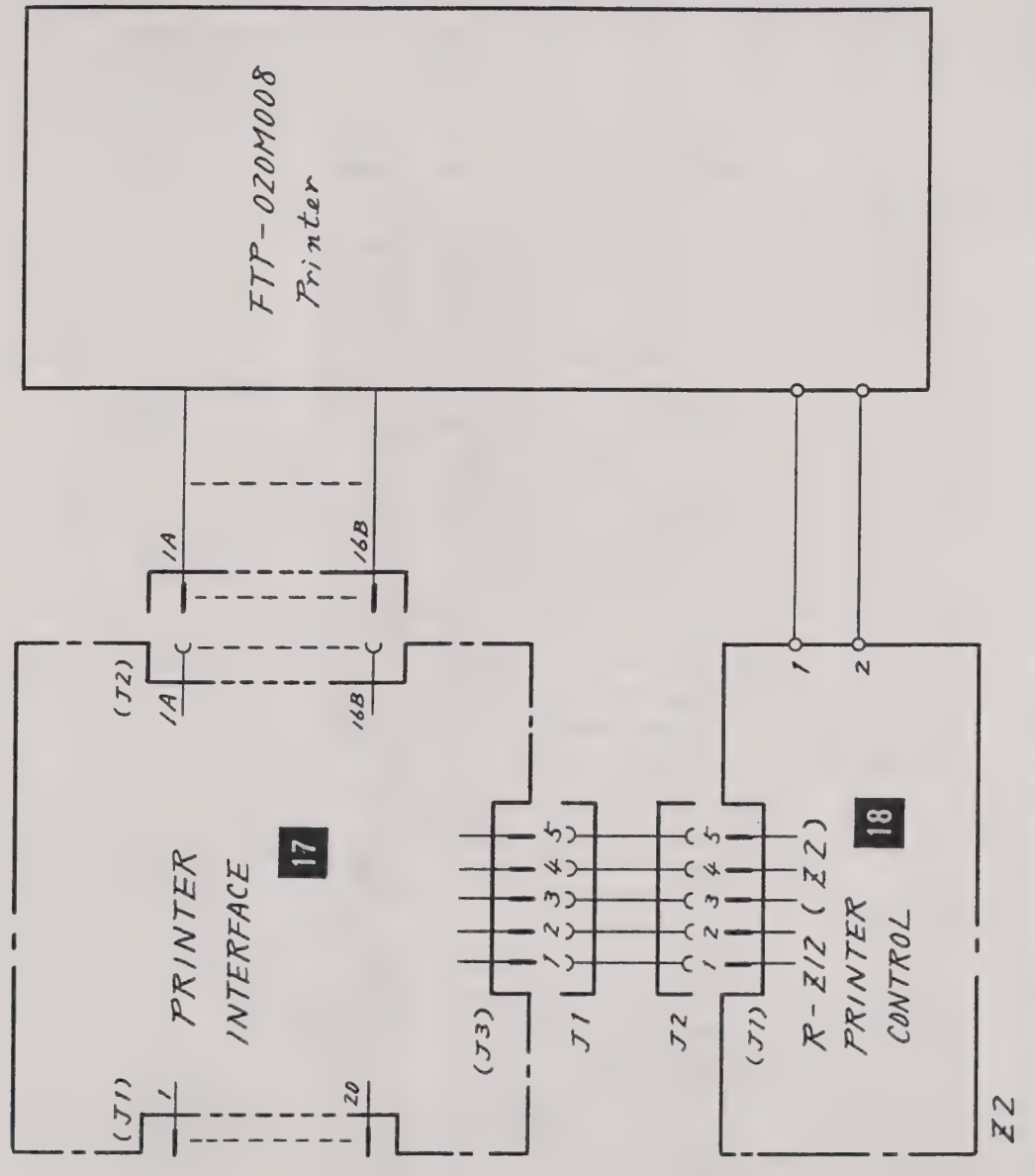
ANRITSU CORP.

3-209/3-210

4

APPLICATION

REVISIONS



Parts List 44W85802

16

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH	NOTE

CHECKED BY	TRACED BY	SCALE	
APPROVED BY	DRAWN BY		

OEP

TITLE: A8 PRINTER UNIT

DRAWING No. 44W85803 1/1

No 0025-1985 03

ANRITSU CORP.

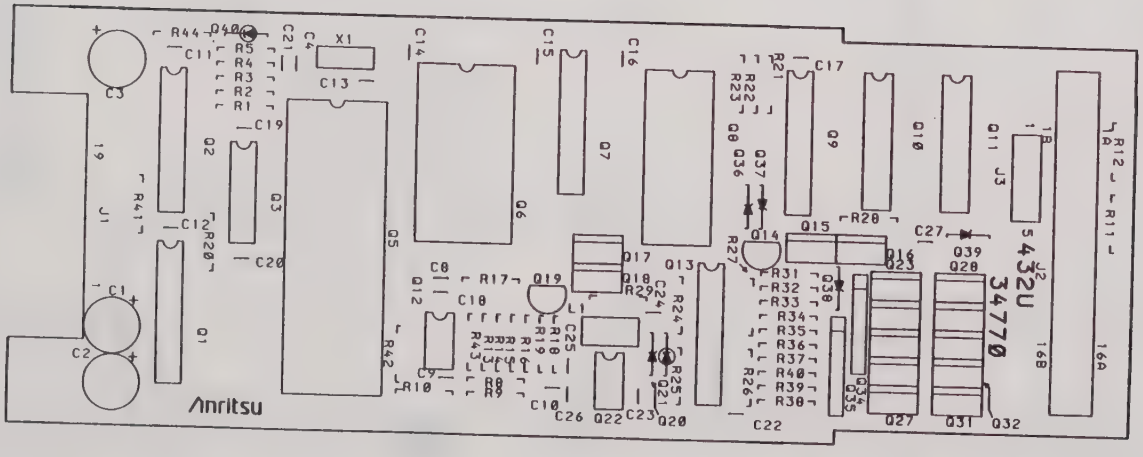
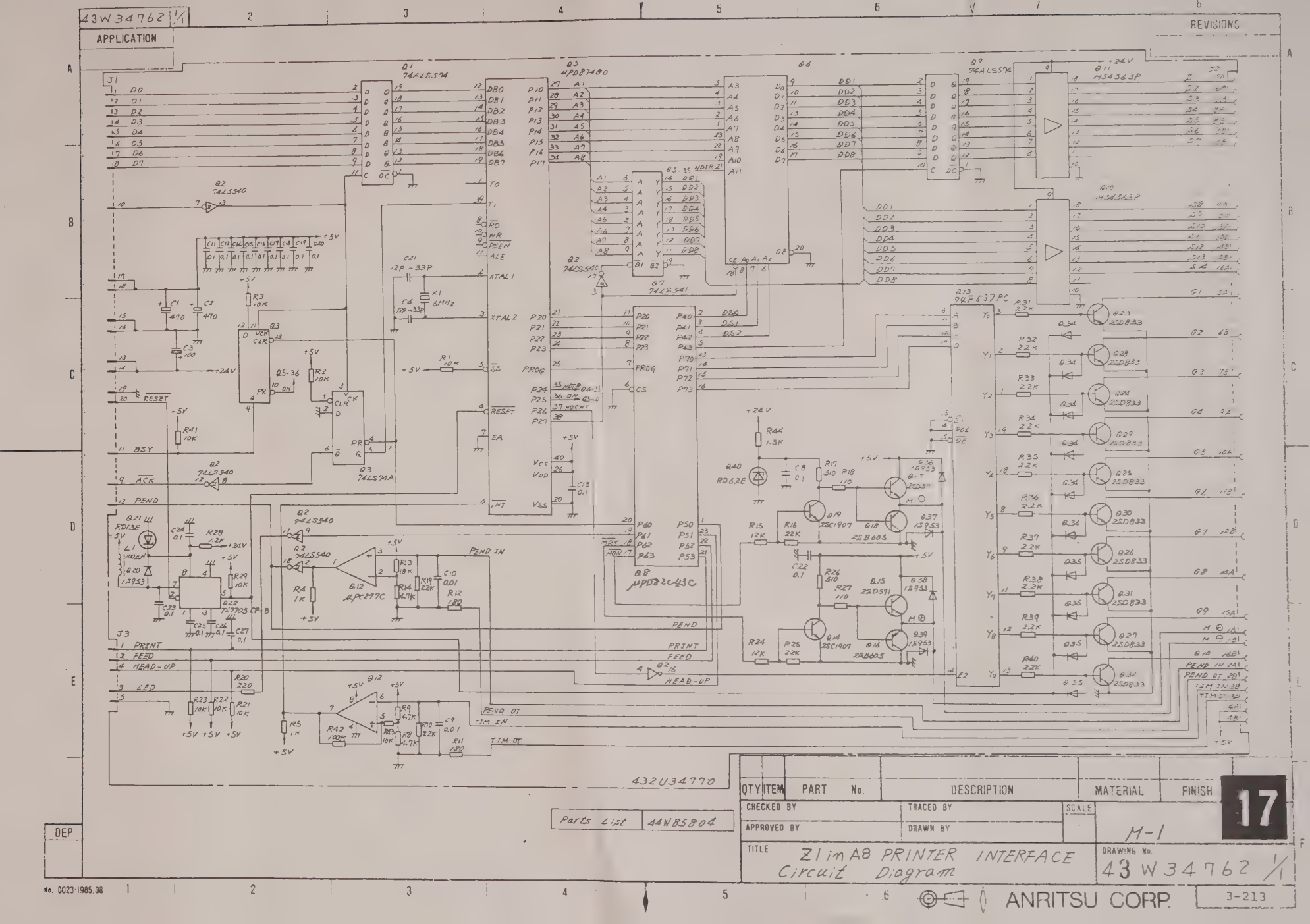


Fig. 3-116 Z1 in A8 PRINTER INTERFACE PC Board Parts Layout

17


43W34762 1/1
APPLICATION
REVISIONS
J1
J3
Q1 74ALS574
Q2 74LS540
Q3 74LS74A
Q3 μPD71071
Q4 74LS541
Q5-35 4DIR 21
Q6
Q7 74LS541
Q8 μPD72C43C
Q9 74ALS574
Q10 M54563P
Q11 M54563P
Q12 μPC277C
Q13 74F537PC
X1 6MHz
C21 12P ~ 33P
C4 12P ~ 33P
+5V
+24V
RESET
BSY
ACK
PEND
PRINT
FEED
HEAD-UP
LED
PEND IN
PEND
PRINT
FEED
HEAD-UP
PEND OT
TIM IN
TIM OT
Parts List 44W85804
DEP
QTY ITEM PART No. DESCRIPTION MATERIAL FINISH
CHECKED BY
TRACED BY
SCALE
APPROVED BY
DRAWN BY
M-1
TITLE 21inA8 PRINTER INTERFACE Circuit Diagram
DRAWING No. 43W34762 1/1
17
No. 0023-1985.08
ANRITSU CORP.
3-213

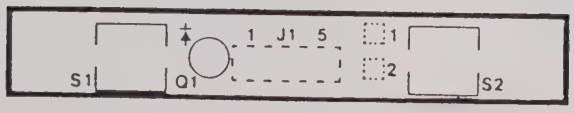
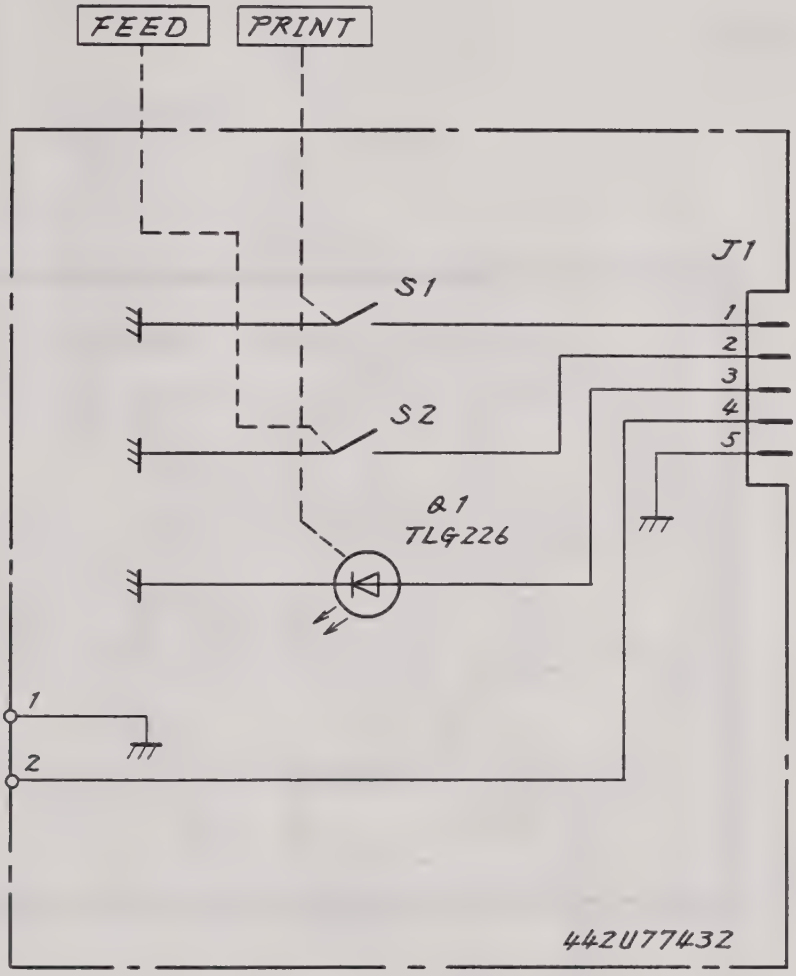


Fig. 3-117 Z2 in A8 PRINTER CONTROL PC Board Parts Layout

44W85806 1/1

APPLICATION	REVISIONS



Parts List 44W85805

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

18

CHECKED BY	TRACED BY	SCALE
APPROVED BY	DRAWN BY	

DEP

TITLE Z2 in A8 PRINTER CONTROL

DRAWING No. 44W85806 1/1

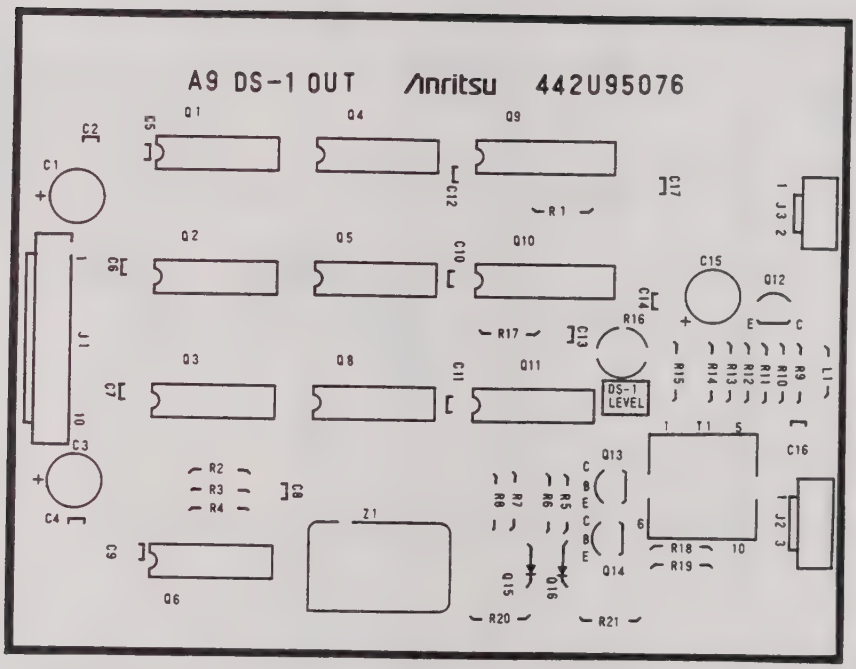
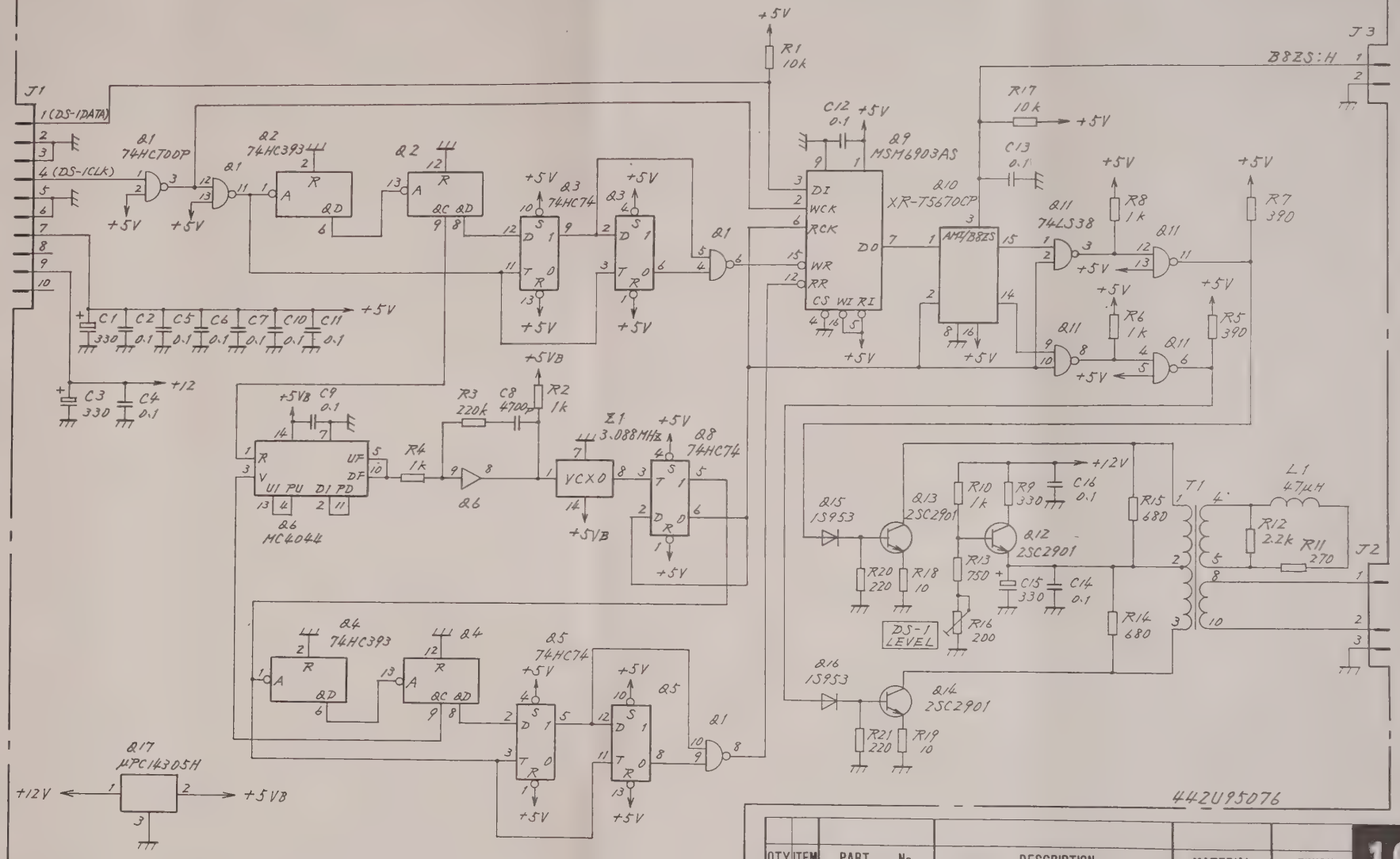


Fig. 3-118 A9 DS-1 OUTPUT PC Board Parts Layout

19



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY | DRAWN BY | SCALE

APPROVED BY | DESIGNED BY

TITLE: A9 DS-1 OUTPUT Circuit Diagram (Receiver) (OPT 03)

DRAWING No. 43W39923 1/1

Parts List 44WP5156

ANRITSU CORP.

43W39923 1/1

APPLICATION

REVISIONS

DEP

19

3-217/3-218

No. 0023-1988.05

SECTION 4

REPLACEABLE PARTS

4.1 Introduction

This section describes how to order replacement parts or components. The following tables (Table 4-2 and 4-3) show circuit references (CKT REF) and abbreviations used for items in the Parts Lists. The quantity of each item in the Parts Lists. The quantity of each item in the Parts List is "one" unless another value is given in the "NOTE" column.

4.2 Ordering information

When ordering parts, please supply the following description from the PARTS LIST.

Table 4-1 Ordering Information

No.	Item	Example
1	Instrument name	ME3401A Transmitter, Digital Transmission Analyzer
2	Parts location	Parts of Z1 POWER SUPPLY
3	CKT REF	R1
4	Parts name	ARD25T 100J Note: The part name is given in parentheses ( ) in the Parts List. Parts with asterisk* require factory adjustment upon repair. When ordering part(s) marked with an asteirsk, give full description of the part(s).
5	Quantity	1
6	Instrument serial No.	M31257

4.3 Circuit References and Abbreviations used in the Parts List

(1) Circuit references

Table 4-2

A:	PC board	G:	Fan	M:	Meter, timer	S:	Switch
B:	Speaker	J:	Jack, plug, connector	P:	Lamp	T:	Transformer
C:	Capacitor	K:	Relay	Q:	Transistor, diode, IC, rectifier	W:	Cable
E:	Terminal	K:	Coil microinductor	R:	Resistor	X:	Crystal OSC
F:	Fuse					Z:	Miscellaneous

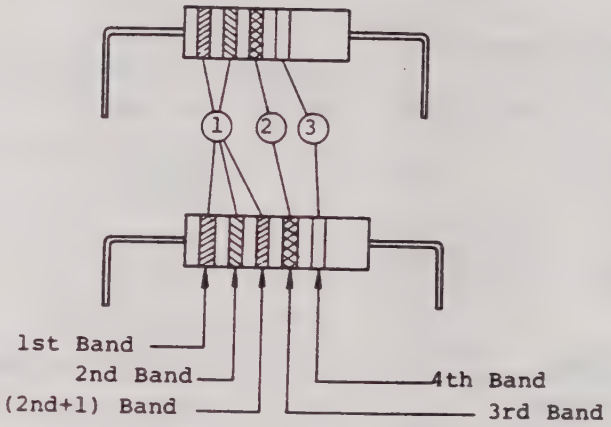
(2) Abbreviations

Table 4-3

A:	amperes	Multi:	multiplying
Att, R var:	variable attenuator using film elements	N-ch:	N-channel
		non-lin:	non-linear taper
BL:	boundary layer	Non-pol:	non polarity
Cer:	ceramic	NPN:	negative-positive-negative
CF:	carbon film	Ω:	ohms
Comp:	composition	p:	pico (x 10^{-12})
CRT:	cathode-ray tube	Plast:	plastic film
Di:	diode	PMTR:	potentiometer
DIP:	dual in-line package	PNP:	positive-negative-positive
Elect:	electrolytic aluminum	p-p:	peak-to-peak value
F:	farad	RFC:	RF choke
FET:	field-effect transistor	R-lamp:	resistor lamp
G:	ground	rms:	effective value (root-mean-square)
Ge:	germanium	SBD:	Schottky barrier diode
H:	henry	SCR:	silicon-controlled rectifier
Hz:	hertz	Si:	silicon
IC:	integrated circuit	SRD:	step-recovery diode
IEC:	Conforms to IEC Safety Standards	Tant:	tantalum
J-FET:	junction FET	TM:	time-lag
k:	kilo (x 10^{3})	Tr:	transistor
LED:	light-emitting diode	Trans:	transformer
M:	mega (x 10^{6})	μ:	micro (x 10^{-6})
m:	milli (x 10^{-3})	V:	volt
MF:	metallized film	Var:	variable
MOS-FET:	metal-oxide semiconductor FET	WW:	wire-wound
M paper:	metallized paper	XTAL:	crystal
M plast:	metallized plastic film		

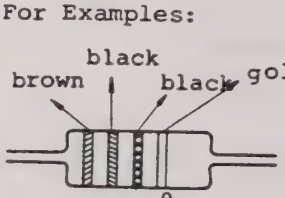
4.4 Reading Capacitance and Resistance

(1) Reading resistance



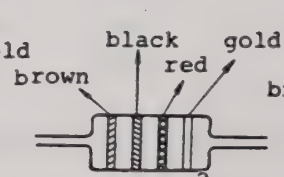
COLOR	① Figure		② Multiplier	③ Tolerance
	1st	2nd	3rd	4th
Black	0	0	$x10^0$	-
Brown	1	1	$x10^1$	-
Red	2	2	$x10^2$	-
Orange	3	3	$x10^3$	-
Yellow	4	4	$x10^4$	-
Green	5	5	$x10^5$	±0.5%
Blue	6	6	$x10^6$	-
Purple	7	7	$x10^7$	-
Gray	8	8	$x10^8$	-
White	9	9	$x10^9$	-
Gold	-	-	$x10^{-1}$	±5%
Silver	-	-	$x10^{-2}$	±10%
-----	-	-		±20%

For Examples:



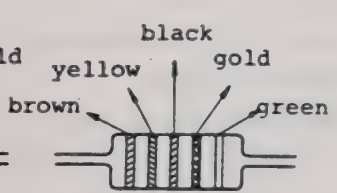
10×10^0 ±5%

10 Ω, ±5%



10×10^2 ±5%

1 kΩ, ±5%



140×10^{-1} ±0.5%

14.0 Ω, ±0.5%

(3) Reading capacitance

Examples: 103 = 100,000 pF = 10^{-8} or 0.01 µF

302 = 3,000 pF = 3 x 10^{-9}F or 0.003 µF

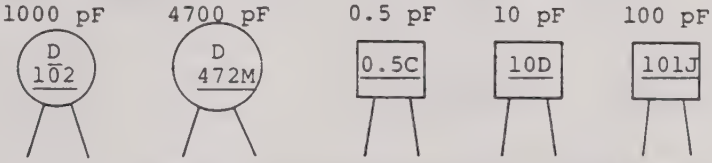
676 = 67,000,000 pF = 67 x 10^{-6}F or 67 µF

(a) Ceramic capacitors, polyester capacitors

Marking	0.5	1	10	101	102	103	104
Capacity	0.5 pF	1 pF	10 pF	100 pF	1000 pF	0.01 µF	0.1 µF

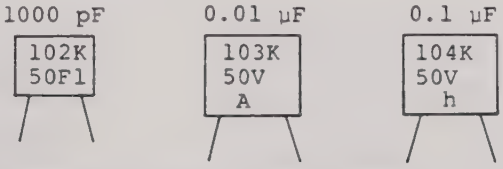
Examples:

Ceramic Capacitors



Capacity values are always underlined.

Polyester Capacitors



(b) Tantalum capacitors, Metallized capacitors and Electrolytic capacitors

Marking	OR47	010	100	101
Capacitor	0.47 µF	1 µF	10 µF	100 µF

4.5 Parts List

Note:

See Table 3-4 and Table 3-5 for a list of the circuit diagram names/numbers, Z numbers, PC board numbers, and parts list numbers.

Parts List: DIGITAL TRANSMISSION ANALYZER ME3401A TRANSMITTER 1

CKT REF	DESCRIPTION	RATING	NOTE
A 1	PATTERN GENERATOR (422U13832)		44W88385
A 2	T-CONTROL(422U13834)		44W88386
A 3	T-DISPLAY(422U13836)		44W88387
A 4	JITTER MODULATION (422U13913)		44W88388 OPT01
A 5	MODULATION SIGNAL GENERATOR(432U36046)		44W88408 OPT01
A 6	T-SWITCH(442U91223)		44W90993
A 7	GP-IB(442U83054)		44W83046 OPT41
A 8	RS-232C(442U83056)		44W83047 OPT43
E 1	Terminal,(44E87532)		
E 2	Terminal,(ML-9DE(2P))		
G 1	Fan,(FBK-08A12LZ)		
J 1	Jack,(DF1-15S2.5R24)		
J 2	Jack,(DF1-2S2.5R24)		
J 3	Jack,(DF1-2S2.5R24)		
J 4	Not assigned		
J 5	Jack,(U-SA1003)		
J 6	Jack,(DF1-15S2.5R24)		
J 7	Jack,(DF1-2S2.5R24)		
J 8	Not assigned		
J 9	Not assigned		
J 10	Not assigned		
J 11	Receptacle, (BNC-R-101-NI)		
J 12	Receptacle, (BNC-R-101-NI)		
J 13	Receptacle, (BNC-R-101-NI)		
J 14	Receptacle, (BNC-R-101-NI)		
J 15	Receptacle, (BNC-R-101-NI)		
J 16	Receptacle, (BNC-R-101-NI)		
J 17	Receptacle, (BNC-R-101-NI)		

[ ]: Manufacturer's part number
• : Selected at factory

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Parts List: DIGITAL TRANSMISSION ANALYZER ME3401A TRANSMITTER 1

CKT REF	DESCRIPTION	RATING	NOTE
J 18	Receptacle, (BNC-R-101-NI)		
J 19	Inlet,(NC-165)		
J 20	Jack,(DF1-8S2.5R24)		
J 21	Jack,(DF1-2S2.5R24)		
J 22	Jack,(DF1-2S2.5R24)		
J 23	Jack,(DF1-2S2.5R24)		
J 24	Jack,(DF1-2S2.5R24)		
J 25	Jack,(DF1-2S2.5R24)		
J 26	Jack,(DF1-2S2.5R24)		
S 1	Switch,(ESB-76)		
S 2	Switch,(8EJ011)		
T 1	Power,(44T88342)	90VA	
W 1	Cable, (HIF3BA5B-34DAA26S)		
Z 1	Line filter, (MBW-1202-33)		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(SME80LISS-10000S0D)	10000μF,±20%,80V	
C 2	Elect,(CE04C1J100A)	10μF,±20%,63V	
C 3	Elect,(CE04C1V221A)	220μF,±20%,35V	
C 4	Elect,(CE04C1E470A)	47μF,±20%,25V	
C 5	Elect,(CE04C1V221A)	220μF,±20%,35V	
C 6	Elect,(SXE35VB-680 φ12.5 x 25)	680μF,±20%,35V	
C 7	Elect,(SXE25VB-1000 φ12.5 x 25)	1000μF,±20%,25V	
C 8	Elect,(SXE25VB-1000 φ12.5 x 25)	1000μF,±20%,25V	
C 9	Elect,(SXE16VB-1500 φ12.5 x 25)	1500μF,±20%,16V	
C 10	Elect,(SXE16VB-1500 φ12.5 x 25)	1500μF,±20%,16V	
C 11	Elect,(SXE16VB-1500 φ12.5 x 25)	1500μF,±20%,16V	
C 12	Not assigned		
C 13	Not assigned		
C 14	Elect,(CE04C1E221A)	220μF,±20%,25V	
C 15	Not assigned		
C 16	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V	
C 17	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 18	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 19	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 20	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 21	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 23	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 24	Not assigned		
C 25	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 26	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 27	Not assigned		
C 28	Not assigned		
C 29	Not assigned		
C 30	Elect,(CE04C1H2R2A)	2.2μF,±20%,50V	
C 31	Elect,(CE04C1H2R2A)	2.2μF,±20%,50V	
C 32	Elect,(CE04C1A102A)	1000μF,±20%,10V	
C 33	Elect,(CE04C1A101A)	100μF,±20%,10V	
C 34	Elect,(CE04C1E470A)	47μF,±20%,25V	
C 35	Elect,(CE04C1E470A)	47μF,±20%,25V	
C 36	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 37	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 38	Not assigned		
C 39	Not assigned		
C 40	Not assigned		

[ ]: Manufacturer's part number
• : Selected at factory

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Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING	NOTE
C 41	Not assigned		
C 42	Not assigned		
C 43 to C 54	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 55	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 56	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 57	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 58	Elect,(CE04C1J470A)	47μF,±20%,63V	
F 1	Fuse,(MF51NN250V5ADC01)	5A,250V	
F 2	Fuse, (MF51NN250V0.5ADC01)	0.5A,250V	
F 3	Fuse,(MF51NN250V1ADC01)	1A,250V	
F 4	Fuse,(MF51NN250V5ADC01)	5A,250V	
F 5	Fuse,(MF51NN250V2ADC01)	2A,250V	
J 1	Plug,(DF1-15P2.5DSA)	15pins	
J 2	Plug,(DF1-2P2.5DSA)	2pins	
J 3	Plug,(DF1-2P2.5DSA)	2pins	
J 4	Cable,(CNF23-16D-AA20S)		
J 5	Cable,(CNF23-20D-AA10S)		
J 6	Plug,(CNF3-34P-2.54DSA)	34pins	
J 7	Plug,(CNF3-34P-2.54DSA)	34pins	
J 8	Plug,(DF1-2P-2.5DSA)	2pins	
K 1	Relay,(OHD3-90M)		
L 1	Coil,(SK-17C-045-650)	650μH	
L 2	Coil,(SK-17C-045-650)	650μH	
L 3	Coil,(SK-21C-060-550)	550μH	
L 4	Coil,(SK-24S-110-100)	100μH	
L 5	Coil,(SK-24S-110-100)	100μH	
L 6	Coil,(SK-21C-080-140)	140μH	
M 1	Not assigned		
Q 1	IC,(μPC494C)		
Q 2	IC,(μPC1251C)		
Q 3	IC,(μPC393C)		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING		NOTE
Q 4	Tr,(2SC3179)			
Q 5	Tr,(2SA1154)			
Q 6	Tr,(2SC3220)			
Q 7	Tr,(2SC3220)			
Q 8	Photo coupler,(PC618)			
Q 9	Photo coupler,(PC817X)			
Q 10	Not assigned			
Q 11	Rectifier, (D5FB20(4002))			
Q 12	Rectifier,(RB-152-LFB)			
Q 13	Rectifier,(V03G)			
Q 14	Rectifier,(V19E-1)			
Q 15	Rectifier,(V19E-1)			
Q 16	Rectifier,(V19E-1)			
Q 17	Rectifier,(V19E-1)			
Q 18	Rectifier,(V19E-1)			
Q 19	Rectifier,(V19E-1)			
Q 20	Rectifier,(D5LC20U-4000)			
Q 21	Rectifier,(D6LC20U-4000)			
Q 22	Rectifier,(D6LC20UR-4000)			
Q 23	Rectifier,(D10SC4M)			
Q 24	Rectifier,(D10SC4MR)			
Q 25	Not assigned			
Q 26	Not assigned			
Q 27	Not assigned			
Q 28	Di,breakdown,(RD5.1E)	4.8 to 5.37V,500mW		
Q 29	Di,breakdown,(RD13E)	12.11 to 13.66V,500mW		
Q 30	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 31	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 32	Di,(1S955)			
Q 33	Di,(1S955)			
Q 34	Di,(1S953)			
Q 35	Not assigned			
Q 36	Not assigned			
Q 37	Not assigned			
Q 38	Not assigned			
Q 39	Not assigned			
Q 40	Di,(1S953)			
Q 41	Di,(1S953)			
Q 42	Not assigned			
Q 43	Not assigned			
Q 44	Not assigned			
Q 45	IC,(74LS244)			
Q 46	IC,(74LS245)			
Q 47	IC,(74LS14)			
Q 48	IC,(74LS139)			
Q 49	IC,(74LS74)			

( ): Manufacturer's part number
■ : Selected at factory

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Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING		NOTE
Q 50	IC,(74LS32)			
Q 51	IC,(74LS123)			
Q 52	IC,(74LS04)			
Q 53	IC,(74LS155)			
Q 54	IC,(MBJ771(DIP))			
Q 55	IC,(TC74HC00P)			
Q 56	IC,(EPROM32KX8-20C)			
Q 57	IC,(HM6264ALP-15)			
Q 58	IC,(μPD8259AC-2)			
Q 59	IC,(μPD780C-2)			
Q 60	IC,(7437)			
Q 61	IC,(74LS74)			
Q 62	IC,(74LS245)			
Q 63	IC,(μPD71055C-10)			
Q 64	IC,(74LS245)			
Q 65	IC,(74LS244)			
Q 66	IC,(μPC14312H)			
Q 67	IC,(μPC16312H)			
R 1	MF,(RS1FB4.7KΩJ)	4.7kΩ,±5%,1W		
R 2	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 3	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 4	MF,(RN14K2H101J)	100Ω,±5%,1/2W		
R 5	CF,(ARD25T123J)	12kΩ,±5%,1/4W		
R 6	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 7	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 8	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 9	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 10	CF,(RN14K2H470J)	47Ω,±5%,1/2W		
R 11	MF,(RN14K2H100J)	10Ω,±5%,1/2W		
R 12	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 13	MF,(RN14K2H470J)	47Ω,±5%,1/2W		
R 14	MF,(RN14K2H100J)	10Ω,±5%,1/2W		
R 15	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 16	MF,(RS2FB220ΩJ)	220Ω,±5%,2W		
R 17	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W		
R 18	CF,(ARD25T621J)	620Ω,±5%,1/4W		
R 19	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 20	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 21	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 22	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 23	MF,(RN14K2H102J)	1kΩ,±5%,1/2W		
R 24	MF,(RN14K2H102J)	1kΩ,±5%,1/2W		
R 25	MF,(RN14K2H101J)	100Ω,±5%,1/2W		
R 26	MF,(RN14K2H101J)	100Ω,±5%,1/2W		
R 27	Not assigned			

( ): Manufacturer's part number
• : Selected at factory

M-2

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Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING		NOTE
R 28	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 29	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 30	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 31	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 32	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 33	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 34	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 35	Not assigned			
R 36	Not assigned			
R 37	Not assigned			
R 38	Not assigned			
R 39	Not assigned			
R 40	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R 41	Not assigned			
R 42	Not assigned			
R 43	Not assigned			
R 44	Not assigned			
R 45	MF,(RN14K2E2741D)	2.74kΩ,±0.5%,1/4W		
R 46	MF,(RN14K2E1001D)	1kΩ,±0.5%,1/4W		
R 47	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 48	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 49	Not assigned			
R 50	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 51	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 52	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 53	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 54	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 55	MF,(ERF-2AK3R3)	3.3kΩ,±5%,2W		
R 56	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 57	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
T 1	Trans,(44T75381)			
T 2	Trans,(44T75381)			
T 3	Trans,(43JT36051)			
Z 1	XTAL OSC,(TD308C)	8MHz		
Z 2	Battery,(BR-AE2SP)			

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 2	Cer,(CC45CH1H220JY)	22pF,±5%,50V		
C 3	Cer,(CC924CH1H560J)	56pF,±5%,50V		
C 4	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V		
C 5	Cer,(CC924CH1H151J)	150pF,±5%,50V		
C 6	Cer,(CC45CH1H330JY)	33pF,±5%,50V		
C 7	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C 8	Cer,(CC924CH1H151J)	150pF,±5%,50V		
C 9	Cer,(CC45CH1H330JY)	33pF,±5%,50V		
C 10	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C 11	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 12	Cer,(CC45CH1H220JY)	22pF,±5%,50V		
C 13	Cer,var,(TZ03R200A)	20pF,100V		
C 14	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 15	Cer,var,(TZ03Z070A)	7pF,100V		
C 16	Cer,var,(TZ03R200A)	20pF,100V		
C 17	Cer,var,(TZ03R200A)	20pF,100V		
C 18	Not assigned			
C 19	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 20	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 21	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 23	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 25	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 26	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 27	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 28	Not assigned			
C 29	■○			
C ■■	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 41	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 42	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 43	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 44	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 45	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 46	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 47	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 48	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 49	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 50	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 51	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 52	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 53	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C 54	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C 55	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C 5■	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
C 57	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V	
C 58	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V	
C 59	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 60	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V	
C 61	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V	
C 62	Plast,(ECQ-P1152FZ)	1500pF,±1%,100V	
C 63	Plast,(ECQ-P1152FZ)	1500pF,±1%,100V	
C 64	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 65	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 66	Not assigned		
C 67	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 68	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 69	Not assigned		
C 70	Not assigned		
C 71 to C 81	Elect,(CE04C1E101A)	100μF,±20%,25V	
C 82	Not assigned		
C 83	Not assigned		
C 84	Not assigned		
C 85 to C 96	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 97	Not assigned		
C 98	Not assigned		
C 99	Not assigned		
C100	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C101	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C102	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C103	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C104	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C105	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C106	Cer,(RPE111CH161G50)	160pF,±2%,50V	
C107	Cer,(CC924CH1H510J)	51pF,±5%,50V	
C108	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V	
C109	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C110	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C111	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C112	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C113	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C114	Cer,(CC924CH1H560J)	56pF,±5%,50V	
C115	Cer,(CC924CH1H560J)	56pF,±5%,50V	
C116	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C117	Cer,(CC924CH1H101J)	100pF,±5%,50V	
J 1	Cable,(CNF23-34D-AA20S)		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
J 2	Plug,(U-PA1021)		
J 3	Plug,(DF1-15P2.5DSA)	15pins	
J 4	Plug,(CNF3-26P-2.54DS)	26pins	
J 5	Receptacle,(BNC-R-NI)		
J 6	Receptacle,(BNC-R-NI)		
J 7	Receptacle,(JACK238)		
J 8	Receptacle,(BNC-R-NI)		
J 9	Receptacle,(BNC-R-NI)		
J 10	Receptacle,(BNC-R-NI)		
J 11	Receptacle,(BNC-R-NI)		
J 12	Receptacle,(BNC-R-NI)		
J 13	Receptacle,(BNC-R-NI)		
J 14	Plug,(DF1-5P2.5DSA)	5pins	
J 15	Plug,(DF1-2P2.5DSA)	2pins	
K 1 to K 23	Relay,(SVR-5V)		
L 1	Coil,(SP0408-1R5K)	1.5μH,±10%	
L 2	Coil,(10K17-85T)	0.358uH	
L 3	Coil,(439T23535)	0.89μH	
L 4	Coil,(439T23535)	0.89μH	
L 5	Coil,(439T23535)	0.89μH	
L 6	Coil,(439T23535)	0.89μH	
L 7	Coil,(439T23535)	0.89μH	
L 8	Coil,(439T23535)	0.89μH	
L 9	Coil,(442T77577)	0.3μH	
L 10	Coil,(442T77577)	0.3μH	
L 11	Coil,(442T77577)	0.3μH	
L 12	Coil,(442T77577)	0.3μH	
L 13	Coil,(442T77577)	0.3μH	
L 14	Coil,(442T77577)	0.3μH	
L 15	Coil,(LF8-470K)	47uH,±10%	
L 16	Coil,(SP0408-3R3)	3.3μH	
L 17	Coil,(SP0408-3R3)	3.3μH	
L 18	Coil,(J3T20196E)	4.7μH	
L 19	Coil,(J3T20196E)	4.7μH	
L 20	Coil,(439T23535)	0.89μH	
L 21	Coil,(442T77577)	0.3μH	
Q 1 to Q 24	Di,breakdown,(RD3.9E)	3.7 to 4.16V,500mW	

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
Q 25	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW	
Q 26	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW	
Q 27	Di,(1S953)		
Q 28	Not assigned		
Q 29	Di,(1S953)		
Q 30	Di,(1S953)		
Q 31	Di,(1S953)		
Q 32	Di,(1S953)		
Q 33	Not assigned		
Q 34	Di,(1S953)		
Q 35	Not assigned		
Q 36	Tr,(2SC1907)		
Q 37	Tr,(2SC1907)		
Q 38	Tr,(2SC1907)		
Q 39	Not assigned		
Q 40 to Q 89	Tr,(2SC1907)		
Q 90	Tr,(2SC2901)		
Q 91	Tr,(2SC2901)		
Q 92	Tr,(2SC2901)		
Q 93	Tr,(2SC2570)		
Q 94	Tr,(2SC2570)		
Q 95	Tr,(2SC2570)		
Q 96	Tr,(2SC2570)		
Q 97	Tr,(2SA1206)		
Q 98	Tr,(2SA1206)		
Q 99	Di,(1S953)		
Q100	Di,(1S953)		
Q101	IC,(AB109CSP)		
Q102	IC,(10124)		
Q103	IC,(74F74)		
Q104	Not assigned		
Q105	IC,(uPD8253C-2)		
Q106	IC,(74LS04)		
Q107	IC,(10101)		
Q108	IC,(10116)		
Q109	IC,(10101)		
Q110	IC,(10101)		
Q111	IC,(10124)		
Q112	IC,(TD62003P)		
Q113	Not assigned		
Q114	IC,(74LS38)		
Q115	Not assigned		
Q116	Not assigned		
Q117	IC,(uPD8255AC-2)		
Q118	IC,(10124)		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
Q119	IC,(74F174)		
Q120	IC,(10124)		
Q121	IC,(74P174)		
Q122	IC,(10124)		
Q123	IC,(74S04)		
Q124	IC,(74S04)		
Q125	IC,(74S00)		
Q126	IC,(74S64)		
Q127	IC,(74LS04)		
Q128	Not assigned		
Q129	Not assigned		
Q130	IC,(74LS74)		
Q131	Not assigned		
Q132	IC,(74LS03)		
Q133	IC,(10125)		
Q134	IC,(74S00)		
Q135	IC,(74F74)		
Q136	IC,(10125)		
Q137	IC,(10125)		
Q138	IC,(HD7400P)		
Q139	IC,(HD7400P)		
Q140	IC,(10116)		
Q141	IC,(74S00)		
Q142	IC,(74S00)		
Q143	IC,(74LS04)		
Q144	IC,(74LS86)		
Q145	IC,(74LS32)		
Q146	IC,(74LS139)		
Q147	IC,(74LS153)		
Q148	IC,(74LS175)		
Q149	IC,(74LS74)		
Q150	IC,(74LS54)		
Q151	IC,(74LS08)		
Q152	IC,(TD62003P)		
Q153	IC,(74LS123)		
Q154	Not assigned		
Q155	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW	
Q156	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW	
Q157	Di,(1S953)		
Q158	Di,(1S953)		
Q159	Di,(1S953)		
Q160	Di,(1S953)		
Q161	Di,breakdown,(RD3.6E)	3.4 to 3.845V,500mW	
Q162	Di,(1S953)		
Q163	Di,(1S953)		
Q164	Di,(1S953)		
Q165	Di,(1S953)		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
Q166	D1,breakdown,(RD3.6E)	3.4 to 3.845V,500mW	
Q167	D1,(1S953)		
Q168	D1,(1S953)		
Q169	D1,(1S953)		
Q170	D1,(1S953)		
Q171	D1,(1S953)		
Q172	D1,(1S953)		
R 1	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 2	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 3	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 4	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 5	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R 6	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R 7	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 8	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 9	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 10	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 11	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 12	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 13	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 14	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 15	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 16	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 17	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 18	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 19	Not assigned		
R 20	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R 21	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R 22	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 23	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 24	Not assigned		
R 25	Not assigned		
R 26	Not assigned		
R 27	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 28	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 29	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 30	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 31	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 32	Not assigned		
R 33	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 34	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 35	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 36	CF,(ARD25T220J)	22Ω,±5%,1/4W	
R 37	Not assigned		
R 38	Not assigned		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R 39	Not assigned		
R 40	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R 41	Not assigned		
R 42	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R 43	Not assigned		
R 44	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R 45	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W	
R 46	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W	
R 47	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 48	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 49	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 50	Not assigned		
R 51	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 52	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 53	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 54	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 55	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 56	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R 57	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 58	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 59	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 60	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 61	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 62	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 63	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 64	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*510Ω
R 65	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 66	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 67	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 68	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 69	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 70	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 71	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 72	CF,(ERD10T561A)	560Ω,±5%,1/8W	
R 73	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R 74	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 75	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 76	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 77	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 78	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 79	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 80	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 81	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*510Ω
R 82	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 83	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 84	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 85	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R 86	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 87	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 88	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 89	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 90	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R 91	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 92	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 93	CF,(ERD25T221A)	220Ω,±5%,1/8W	
R 94	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 95	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 96	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 97	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 98	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*510Ω
R 99	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R100	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R101	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R102	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R103	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R104	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R105	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R106	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R107	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R108	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R109	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R110	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R111	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R112	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R113	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R114	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R115	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*470Ω
R116	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R117	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R118	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R119	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R120	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R121	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R122	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R123	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R124	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R125	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R126	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R127	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R128	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R129	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R130	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R131	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R132	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*470Ω

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R133	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R134	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R135	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R136	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R137	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R138	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R139	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R140	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R141	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R142	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R143	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R144	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R145	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R146	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R147	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R148	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R149	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*470Ω
R150	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R151	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R152	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R153	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R154	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R155	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R156	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R157	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R158	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R159	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R160	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R161	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R162	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R163	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R164	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R165	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R166	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R167	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R168	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R169	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R170	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R171	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R172	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R173	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R174	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R175	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R176	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R177	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R178	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R179	CF,(ARD25T750J)	75Ω,±5%,1/4W	

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R180	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R181	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R182	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R183	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R184	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R185	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R186	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R187	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R188	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R189	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R190	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R191	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R192	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R193	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R194	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R195	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R196	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R197	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R198	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R199	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R200	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R201	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R202	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R203	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R204	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R205	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R206	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R207	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R208	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R209	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R210	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R211	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R212	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R213	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R214	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R215	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R216	Not assigned		
R217	Not assigned		
R218	Not assigned		
R219	Not assigned		
R220	Not assigned		
R221	Not assigned		
R222	Not assigned		
R223	Not assigned		
R224	Not assigned		
R225	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R226	CF,(ARD25T391J)	390Ω,±5%,1/4W	

( ): Manufacturer's part number
■ : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R227	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R228	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R229	CF,(ARD25T100J)	10Ω,±5%,1/4W	
R230	CF,(ARD25T100J)	10Ω,±5%,1/4W	
R231	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R232	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R233	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R234	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R235	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R236	CF,(ARD25T751J)	750Ω,±5%,1/4W	
R237	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R238	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R239	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R240	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R241	CF,(ARD25T330J)	33Ω,±5%,1/4W	
R242	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R243	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R244	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R245	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R246	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R247	CF,(ARD25T330J)	33Ω,±5%,1/4W	
R248	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R249	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R250	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R251	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W	
R252	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W	
R253	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R254	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R255	MF,(RN14K2E1780D)	178Ω,±0.5%,1/4W	
R256	Not assigned		
R257	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R258	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R259	CF,(ARD25T820J)	82Ω,±5%,1/4W	
R260	CF,(ARD25T131J)	130Ω,±5%,1/4W	
R261	Not assigned		
R262	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R263	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R264	Not assigned		
R265	Not assigned		
R266	MF,(RN14K2E1780D)	178Ω,±0.5%,1/4W	
R267	Not assigned		
R268	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R269	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R270	CF,(ARD25T820J)	820Ω,±5%,1/4W	
R271	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R272	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R273	CF,(ARD25T391J)	390Ω,±5%,1/4W	

( ): Manufacturer's part number
■ : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R274	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R275	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R276	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R277	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R278	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R279	Not assigned		
R280	Not assigned		
R281 to R292	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R293	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R294	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R295	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R296	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R297	Not assigned		
R298	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R299	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R300	Not assigned		
R301	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R302	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R303	Not assigned		
R304	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R305	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R306	Not assigned		
R307	Not assigned		
R308	Not assigned		
R309	Not assigned		
R310	Not assigned		
R311	SIP type,(RRS-8-472JA)	4.7kΩ x 8,±5%,1/8W	
R312	SIP type,(RRS-4-103JA)	10kΩ x 4,±5%,1/8W	
R313	SIP type,(RRS-6-102JA)	1kΩ x 6,±5%,1/8W	
R314	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R315	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R316	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R317	CP,(ARD25T471J)	470Ω,±5%,1/4W	
R318	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R319	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R320	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R321	SIP type,(RRS-6-471JA)	470Ω x 6,±5%,1/8W	
R322	SIP type,(RRS-6-471JA)	470Ω x 6,±5%,1/8W	
R323	SIP type,(RRS-6-471JA)	470Ω x 6,±5%,1/8W	
R324	Not assigned		
R325	CF,(ARD25T301J)	300Ω,±5%,1/4W	
R326	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R327	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R328	CM,var,(RJ-6P 2kΩ)	2kΩ,1/2W	
R329	CF,(ARD25T102J)	1kΩ,±5%,1/4W	

( ): Manufacturer's part number
■ : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R330	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R331	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R332	CF,(ARD25T301J)	300Ω,±5%,1/4W	
R333	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R334	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R335	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R336	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R337	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R338	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R339	Not assigned		
R340	Not assigned		
R341	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R342	CF,(ARD25T111J)	110Ω,±5%,1/4W	
R343	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R344	CF,(ARD25T111J)	110Ω,±5%,1/4W	
R345	Not assigned		
R346	Not assigned		
R347	Not assigned		
R348	Not assigned		
R349	Not assigned		
R350	Not assigned		
R351	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R352	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R353	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R354	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R355	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R356	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R357	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R358	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R359	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R360	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R361	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R362	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R363	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R364	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R365	CM,var,(RJ-6P 1kΩ	1kΩ,1/2W	
R366	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R367	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R368	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R369	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R370	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R371	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R372	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R373	CF,(ARD25T333J)	33kΩ,±5%,1/4W	
R374	Not assigned		
R375	Not assigned		
R376	Not assigned		

( ): Manufacturer's part number
■ : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING		NOTE
R377	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R378	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R379	CF,(ARD25T150J)	15Ω,±5%,1/4W		
R380	CF,(ARD25T150J)	15Ω,±5%,1/4W		
R381	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R382	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R383	Not assigned			
R384	Not assigned			
R385	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R386	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R387	CM,var,(RJ-6P 5KΩ)	5kΩ,1/2W		
R388	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R389	Not assigned			
R390 to R401	CM,var,(RG04B202M)	2kΩ,1/4W		
S 1	DIP,(51D-0401)			
T 1	Trans,(4J9T23519)			
X 1	XTAL,(44X80043)	44.736MHz		
X 2	XTAL,(44X68612C)	12.624MHz		
X 3	XTAL,(44X68612E)	12.608MHz		
X 4	XTAL,(44X68612A)	6.176MHz		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A3 T-DISPLAY (TRANSMITTER) 4

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(KME10T-220M)	220uF,±20%,10V		
C 2	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 3	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 4	Elect,(KME10T-220M)	220uF,±20%,10V		
C 5	Elect,(KME10T-220M)	220uF,±20%,10V		
J 1	Plug,(CNF3-20P-2.54DSA)	20pins		
Q 1	IC,(uPD8279C-2)			
Q 2	IC,(74LS139)			
Q 3	IC,(74HC238)			
Q 4	IC,(TD62381P)			
Q 5	IC,(TD62785AP)			
Q 6	IC,(74HC238P)			
Q 7	IC,(TD62381P)			
Q 8	IC,(74HC00)			
Q 9	Not assigned			
Q 10	LED,(LN442YPH)			
Q 11 to Q 41	LED,(TLG209)			
Q 42	LED,(LT-9200N)			
Q 43	LED,(LT-9200N)			
Q 44	Not assigned			
Q 45	Not assigned			
Q 46	Not assigned			
Q 47	Not assigned			
Q 48	Not assigned			
Q 49	Not assigned			
Q 50	IC,(LN513GK)			
Q 51	IC,(LN513GK)			
Q 52	IC,(LN513GK)			
Q 53	IC,(LN513GK)			
Q 54	IC,(LN513GK)			
Q 55	IC,(LN513GK)			
Q 56	IC,(LN513GK)			
Q 57	IC,(LN513GK)			
R 1	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		
R 2	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		
R 3	SIP type,(RRS-6-223JB)	22kΩ x 6,±5%,1/8W		
R 4	SIP type,(RRS-4-223JA)	22kΩ x 4,±5%,1/8W		
R 5	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		
R 6	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A3 T-DISPLAY (TRANSMITTER) 4

CKT REF	DESCRIPTION	RATING		NOTE
R 7	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		
S 1 to S 19	Switch,(TM1-01)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Cer,(CC45CH1H151JY)	150pF,±5%,50V		
C 2	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
C 3	Cer,(CC45CH1H100DY)	10pF,±0.25%,50V		
C 4	Cer,(CC45CH1H681J)	680pF,±5%,50V		
C 5	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 6	Cer,(CC924CH1H101J)	100pF,±5%,50V		
C 7	Plast,(ECQ-P1132FZ)	1300pF,±1%,100V		
C 8	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V		
C 9	Cer,(RPE111CH201G50)	200pF,±2%,50V		
C 10	Plast,(ECQ-P1272FZ)	2700pF,±1%,100V		
C 11	Plast,(ECQ-P1202FZ)	2000pF,±1%,100V		
C 12	Cer,(CC924CH1H391J)	390pF,±5%,50V		
C 13	Cer,(CC45CH1H151JY)	150pF,±5%,50V		
C 14	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
C 15	Cer,(CC45CH1H100DY)	10pF,±0.25%,50V		
C 16	Cer,(CC924CH1H821J)	820pF,±5%,50V		
C 17	Cer,(CC924CH1H621J)	620pF,±5%,50V		
C 18	Cer,(CC924CH1H101J)	100pF,±5%,50V		
C 19	Plast,(ECQ-P1132FZ)	1300pF,±1%,100V		
C 20	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V		
C 21	Cer,(RPE111CH201G50)	200pF,±2%,50V		
C 22	Plast,(ECQ-P1272FZ)	2700pF,±1%,100V		
C 23	Plast,(ECQ-P1202FZ)	2000pF,±1%,100V		
C 24	Cer,(CC924CH1H391J)	390pF,±5%,50V		
C 25	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 26	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C 27	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C 28	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C 29	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 30	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 31	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 32	Cer,(CC45CH1H470JY)	47pF,±5%,50V		
C 33	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
C 34	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 35	Not assigned			
C 36	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 37	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 38	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 39	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 40	Elect,(CE04C1H2R2A)	2.2uF,±20%,50V		
C 41	Elect,(CE04C1E470A)	47uF,±20%,25V		
C 42	Elect,(CE04C1E470A)	47uF,±20%,25V		
C 43	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 44	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 45	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 46	Not assigned			
C 47	Not assigned			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
C 48	Not assigned			
C 49	Not assigned			
C 50	Plast,(ECQ-V1H684JW)	0.68μF,±5%,50V		
C 51 to C 72	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 73	Not assigned			
C 74 to C 89	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 90	Not assigned			
C 91	Not assigned			
C 92	Not assigned			
C 93	Not assigned			
C 94 to C104	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C105	Not assigned			
C106	Not assigned			
C107	Not assigned			
C108	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C109	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C110	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C111	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C112	Cer,(CC45CH1H100DY)	10pF,±0.5%,50V		
C113	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C114	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C115	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C116	Elect,(CE04C1C331A)	330μF,±20%,16V		
C117	Elect,(CE04C1C331A)	330μF,±20%,16V		
C118	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
J 1	Plug,(CNF23-26D-AA10S)			
J 2	Cable,(CNF23-16D-AA50S)			
J 3	Plug,(DF1-2P2.5DSA)	2pins		
J 4	Not assigned			
J 5	Jack,(DF1-5S2.5R24)			
J 6	Plug,(DF1-2P2.5DSA)			
J 7	Plug,(DF1-2P2.5DSA)			
J 8	Plug,(DF1-2P2.5DSA)			
K 1	Not assigned			
K 2	Relay,(SVR-5V)			
K 3	Relay,(SVR-5V)			
K 4	Relay,(SVR-5V)			
K 5	Relay,(SVR-5V)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
K 6	Relay,(SVR-5V)			
L 1	Coil,(LF8-121K)	120μH,±10%		
L 2	Coil,(LF8-121K)	120μH,±10%		
L 3	Coil,(LF8-560K)	56μH,±10%		
L 4	Coil,(LF8-681K)	680μH,±10%		
L 5	Coil,(LF8-681K)	680μH,±10%		
L 6	Coil,(LF8-331K)	330μH,±10%		
L 7	Coil,(LH1-102K)	1.0mH,±10%		
L 8	Coil,(LH1-102K)	1.0mH,±10%		
L 9	Coil,(LF8-561K)	560μH,±10%		
L 10	Coil,(LH1-222K)	2.2mH,±10%		
L 11	Coil,(LH1-222K)	2.2mH,±10%		
L 12	Coil,(LH1-102K)	1.0mH,±10%		
L 13	Coil,(LF8-121K)	120μH,±10%		
L 14	Coil,(LF8-121K)	120μH,±10%		
L 15	Coil,(LF8-560K)	56μH,±10%		
L 16	Coil,(LF8-681K)	680μH,±10%		
L 17	Coil,(LF8-681K)	680μH,±10%		
L 18	Coil,(LF8-331K)	330μH,±10%		
L 19	Coil,(LH1-102K)	1.0mH,±10%		
L 20	Coil,(LH1-102K)	1.0mH,±10%		
L 21	Coil,(LF8-561K)	560μH,±10%		
L 22	Coil,(LH1-222K)	2200μH,±10%		
L 23	Coil,(LH1-222K)	2200μH,±10%		
L 24	Coil,(LH1-102K)	1.0mH,±10%		
L 25	Coil,(10K13M-65)	0.31μH		
L 26	Coil,(339T20197E)	15μH,±3%		
L 27	Coil,(339T20198D)	56μH,±3%		
L 28	Coil,(339T20199C)	220μH,±3%		
Q 1	Di,(1S953)			
Q 2	Di,breakdown,(RD3.9E)	3.7 to 4.16V,500mW		
Q 3	Di,vari-cap,(FC52M)			
Q 4	Di,vari-cap,(FC52M)			
Q 5	Di,vari-cap,(FC52M)			
Q 6	Di,vari-cap,(FC52M)			
Q 7	Di,vari-cap,(FC52M)			
Q 8	Di,vari-cap,(FC52M)			
Q 9	Di,vari-cap,(FC52M)			
Q 10	Di,breakdown,(1SZ52)	5.9 to 6.5V,250mW		
Q 11	Tr,(2SA836)			
Q 12	Tr,(2SA836)			
Q 13	Tr,(2SA836)			
Q 14	Tr,(2SA836)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
Q 15	Tr,(2SC1907)			
Q 16	Tr,(2SC1907)			
Q 17	IC,(NJU201AD)			
Q 18	IC,(HAJ-2525-5)			
Q 19	IC,(NJU201AD)			
Q 20	IC,(HAJ-2525-5)			
Q 21	IC,(μPC151C)			
Q 22	IC,(μPC271C)			
Q 23	IC,(μPC1630SH)			
Q 24	IC,(HAJ-2525-5)			
Q 25	Di,vari-cap,(FC52M)			
Q 26	Not assigned			
Q 27	Not assigned			
Q 28	Not assigned			
Q 29	Not assigned			
Q 30	IC,(74LS86)			
Q 31	IC,(74LS191)			
Q 32	IC,(74LS123)			
Q 33	IC,(74LS20)			
Q 34	IC,(74LS191)			
Q 35	IC,(74LS74)			
Q 36	IC,(74LS08)			
Q 37	IC,(74LS14)			
Q 38	IC,(74LS191)			
Q 39	IC,(74LS04)			
Q 40	Not assigned			
Q 41	IC,(74LS74)			
Q 42	IC,(TD62003P)			
Q 43	IC,(10124)			
Q 44	IC,(HA17012PC)			
Q 45	IC,(MC1648P)			
Q 46	IC,(MC1648P)			
Q 47	IC,(MC1648P)			
Q 48	IC,(MC1648P)			
Q 49	Not assigned			
Q 50	Not assigned			
Q 51	IC,(MC10115L)			
Q 52	IC,(10102)			
Q 53	IC,(μPC177C)			
Q 54	IC,(10101)			
Q 55	IC,(HD10101)			
Q 56	IC,(74F160)			
Q 57	IC,(10124)			
Q 58	IC,(MC12040L)			
Q 59	Not assigned			
Q 60	Not assigned			
Q 61	IC,(10124)			

( ): Manufacturer's part number
• Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
Q 62	IC,(10125)			
Q 63	IC,(74S04)			
Q 64	IC,(74F151)			
Q 65	IC,(74F161)			
Q 66	IC,(74F151)			
Q 67	IC,(74F160)			
Q 68	IC,(74F00)			
Q 69	Not assigned			
Q 70	Not assigned			
Q 71	IC,(74F161)			
Q 72	IC,(74F374)			
Q 73	IC,(74F374)			
Q 74	IC,(74F374)			
Q 75	IC,(74F374)			
Q 76	IC,(74F74)			
Q 77	IC,(74F00)			
Q 78	IC,(74F164)			
Q 79	Not assigned			
Q 80	Not assigned			
Q 81	IC,(74F164)			
Q 82	IC,(74F175)			
Q 83	IC,(74S04)			
Q 84	IC,(74S04)			
R 1	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 2	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 3	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 4	CF,(ARD25T100J)	10Ω,±5%,1/4W		
R 5	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 6	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 7	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 8	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 9	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 10	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 11	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 12	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 13	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 14	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 15	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 16	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 17	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 18	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 19	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 20	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 21	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 22	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING	NOTE
R 23	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 24	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 25	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 26	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 27	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 28	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 29	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 30	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 31	Not assigned		
R 32	MF,(RN14K2E9090D)	909Ω,±0.5%,1/4W	
R 33	Not assigned		
R 34	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 35	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 36	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R 37	CF,(ARD25T333J)	33kΩ,±5%,1/4W	
R 38	CF,(ARD25T183J)	18kΩ,±5%,1/4W	
R 39	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 40	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 41	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 42	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 43	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 44	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 45	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 46	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 47	Not assigned		
R 48	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 49	MF,(RN14K2E2491D)	2.49kΩ,±0.5%,1/4W	
R 50	MF,(RN14K2E2741D)	2.74kΩ,±0.5%,1/4W	
R 51	MF,(RN14K2E3011D)	3.01kΩ,±0.5%,1/4W	
R 52	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W	
R 53	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W	
R 54	Not assigned		
R 55	Not assigned		
R 56	Not assigned		
R 57	Not assigned		
R 58	Not assigned		
R 59	MF,(RN14K2H330J)	33Ω,±5%,1/2W	
R 60	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 61	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 62	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 63	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 64	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 65	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 66	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 67	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 68	Not assigned		
R 69	Not assigned		

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING	NOTE
R 70	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R 71	SIP type,(RRS-8-681JA)	680Ω x 8,±5%,1/8W	
R 72	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W	
R 73	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 74	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 75	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 76	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 77	MF,(RN14K2E8660D)	866Ω,±0.5%,1/4W	
R 78	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 79	MF,(RN14K2E1431D)	1.43kΩ,±0.5%,1/4W	
R 80	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 81	MF,(RN14K2E1001D)	1.0kΩ,±0.5%,1/4W	
R 82	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 83	MF,(RN14K2E69R8D)	69.8Ω,±0.5%,1/4W	
R 84	MF,(RN14K2E1210D)	121Ω,±0.5%,1/4W	
R 85	MF,(RN14K2E32R4D)	32.4Ω,±0.5%,1/4W	
R 86	MF,(RN14K2E * D)	10.0 to 51.1Ω,±5%, 1/4W	*
R 87	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 88	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R 89	MF,(RN14K2E5760D)	576Ω,±0.5%,1/4W	
R 90	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R 91	MF,(RN14K2E6980D)	698Ω,±0.5%,1/4W	
R 92	MF,(RN14K2E2431D)	2.43kΩ,±0.5%,1/4W	
R 93	MF,(RN14K2E2871D)	2.87kΩ,±0.5%,1/4W	
R 94	MF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W	
R 95	MF,(RN14K2E2611D)	2.61kΩ,±0.5%,1/4W	
R 96	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 97	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 98	CM,var,(RGS4H204)	200kΩ,1/4W	
R 99	CM,var,(RGS4H204)	200kΩ,1/4W	
R100	CM,var,(RGS4H204)	200kΩ,1/4W	

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A5 MODULATION SIGNAL GENERATOR (TRANSMITTER) 6

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 2	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 3	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 4	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 5	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 6	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 7	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 8	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 9	Cer,(CC45CH1H100DY)	10pF,±0.25%,50V	
C 10	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 11	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 12	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 13	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 14	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 15	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 16	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 17	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 18	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 19	Cer,(CC924CH1H221J)	220pF,±5%,50V	
C 20	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 21	Cer,(CC924CH1H221J)	220pF,±5%,50V	
C 22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 23	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 25	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 26	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 27	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 28	Plast,(ECQ-P1123FZ)	12000pF,±1%,100V	
C 29	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 30	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 31	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 32	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 33	Cer,(CC45CH1H101JY)	100pF,±5%,50V	
C 34	Plast,(ECQ-P1473FZ)	47000pF,±1%,100V	
C 35	Plast,(ECQ-P1123FZ)	12000pF,±1%,100V	
C 36	Plast,(ECQ-P1473FZ)	47000pF,±1%,100V	
C 37	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 1	Plast,(ECNF3-16F-2.54DSA)	16pins	
C -	Plug,(DF-12P-5DSA	12pins	
L 1	Coil,(LF8-221K)	220μH,±10%	
L 2	Coil,(LF8-391K)	390μH,±10%	
L 3	Coil,(LF8-221K)	220μH,±10%	
L 4	Coil,(LH-123K)	12mH,±10%	

( ): Manufacturer's part number
* : Selected at factory

44W88408 1/2

Parts List: A5 MODULATION SIGNAL GENERATOR (TRANSMITTER) 6

CKT REF	DESCRIPTION	RATING	NOTE
L 5	Coil,(LH1-183K)	18mH,±10%	
L 6	Coil,(LH1-123K)	12mH,±10%	
Q 1	IC,(NJM5534D)		
Q 2	IC,(NJM5534D)		
Q 3	IC,(AD7533LN)		
Q 4	IC,(74LS365A)		
Q 5	IC,(74HC74)		
Q 6	IC,(74HC74)		
Q 7	IC,(74HC595)		
Q 8	IC,(74HC273)		
Q 9	IC,(LT1016CN8)		
Q 10	IC,(74HC595)		
Q 11	IC,(74HC283)		
Q 12	IC,(74CH273)		
Q 13	IC,(74LS00)		
Q 14	IC,(74LS390)		
Q 15	IC,(NJM5534D)		
Q 16	IC,(74HC595)		
Q 17	IC,(74HC283)		
Q 18	IC,(EPROM32KX8-20C)		
Q 19	IC,(NJM5534D)		
Q 20	IC,(NJU201AD)		
Q 21	IC,(74HC283)		
Q 22	IC,(74HC283)		
Q 23	IC,(74HC273)		
Q 24	IC,(74LS273)		
Q 25	IC,(μPC624C)		
Q 26	Di,breakdown,(1S252)	5.9 to 6.5V,250mW	
R 1	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 2	MF,(RN14K2E4751D)	4.75kΩ,±0.5%,1/4W	
R 3	CM,var,(RJ-6P 2kΩ)	2kΩ,1/2W	
R 4	MF,(RN14K2E1001D)	1.0kΩ,±0.5%,1/4W	
R 5	MF,(RN14K2E1001D)	1.0kΩ,±0.5%,1/4W	
R 6	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R 7	MF,(RN14K2E6040D)	604Ω,±0.5%,1/4W	
R 8	Not assigned		
R 9	MF,(RN14K2E6040D)	604Ω,±0.5%,1/4W	
R 10	MF,(RN14K2E5110D)	511Ω,±0.5%,1/4W	
R 11	MF,(RN14K2E5110D)	511Ω,±0.5%,1/4W	
R 12	MF,(RN14K2E6040D)	604Ω,±0.5%,1/4W	
R 13	MF,(RN14K2E3011D)	3.01kΩ,±0.5%,1/4W	
R 14	MF,(RN14K2E3011D)	3.01kΩ,±0.5%,1/4W	
R 15	CF,(ARD25T681J)	680Ω,±5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

44W8408 2/2

Parts List: A5 MODULATION SIGNAL GENERATOR (TRANSMITTER) 6

CKT REF	DESCRIPTION	RATING		NOTE
R 16	SIP type, (RRS-6-103JA)	10kΩ x 6, ±5%, 1/8W		
R 17	Not assigned			
R 18	Not assigned			
R 19	Not assigned			
R 20	MF, (RN14K2E1502D)	15.0kΩ, ±0.5%, 1/4W		
Z 1	XTAL OSC, (TD308C)	3.277MHz		

[ ]: Manufacturer's part number
•: Selected at factory

44W88408 3/3

Parts List: A6 T-SWITCH (TRANSMITTER) 7

CKT REF	DESCRIPTION	RATING		NOTE
J 1	Plug, (CNF3-16P-2.54DSA)	16pins		
J 2	Plug, (DF1-8P2.5DSA)	8pins		
S 1	Switch, (SLEP223D-F)			
S 2	Switch, (SLEP222D-G)			
S 3	Switch, (SLEP223D-F)			
S 4	Not assigned			
S 5	Not assigned			
S 6	Switch, (DIP-A(8))			
S 7	Switch, (DISS2A)			

[ ]: Manufacturer's part number
•: Selected at factory

44W90993 1/1

Parts List : A7 (Option 41) GP-IB 8

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect, (CE02C1A470)	47uF, ±20%, 10V		
C 2	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 3	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 4	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 5	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 6	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 7	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 8	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
J 1	Pattern			
J 2	Connector, (57LE-20240-27CO-D35H)			
Q 1	IC, (75160A)			
Q 2	IC, (75162A)			
Q 3	IC, (uPD7210C)			
Q 4	IC, (74LS00)			
Q 5	IC, (74LS367A)			
Q 6	IC, (74LS240)			
Q 7	IC, (74LS74A)			
Q 8	IC, (74LS32)			
Q 9	IC, (74LS139)			
R 1	Single in-line array, (IHR-8-103JA)	10kΩ x 8, 1/8W		
S 1	Dip, (BP-8)			

[ ]: Manufacturer's part number
•: Selected at factory

44W83046 1/1

Parts List : A8 (Option 43) RS-232C 9

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect, (CE02C1A470)	47uF, ±20%, 10V		
C 2	Elect, (CE02C1C330)	33uF, ±20%, 16V		
C 3	Elect, (CE02C1C330)	33uF, ±20%, 16V		
C 4	Cer, (CC924CH1H151J)	150pF, ±5%, 50V		
C 5	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 6	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 7	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 8	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C 9	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C10	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C11	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C12	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
C13	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V		
J 1	Pattern			
J 2	Connector, (DB-25SA-J4)			
Q 1	IC, (SN75189AN)			
Q 2	IC, (74LS240)			
Q 3	IC, (SN75188N)			
Q 4	IC, (uPD8251AFC)			
Q 5	IC, (74LS04)			
Q 6	IC, (74LS367A)			
Q 7	IC, (COM8146)			
Q 8	IC, (74LS139)			
R 1	Single in-line array, (IHR-8-103JA)	10kΩ x 8, 1/8W		
R 2	Single in-line array, (IHR-4-103JA)	10kΩ x 4, 1/8W		
S 1	Dip, (S-2031)			
S 2	Dip, (B-8A)			
X 1	XTAL OSC, (MX-5068)	5.0688MHz		

[ ]: Manufacturer's part number
•: Selected at factory

44W83047 1/1

Parts List: DIGITAL TRANSMISSION ANALYZER ME3401A RECEIVER 10

CKT REF	DESCRIPTION	RATING	NOTE
A 1	ERROR DET(422U13838)		44W88390
A 2	R-CONTROL(422U14527)		44W91570
A 3	R-DISPLAY(422U13842)		44W88392
A 4	R-SWITCH(442U88382)		44W88394
A 5	JITTER MEASUREMENT (422U13911)		44W88395 OPT02
A 6	GP-IB(442U83054)		44W83046 OPT42
A 7	RS-232C(442U83056)		44W83047 OPT44
A 8	PRINTER		44W85802 OPT11
A 9	DS-1 OUTPUT(442U95076)		44W95156 OPT 03
G 1	Fan,(FBK-08A12LZ)		
J 1	Jack,(DF1-15S2.5R24)		
J 2	Jack,(DF1-2S2.5R24)		
J 3	Jack,(DF1-2S2.5R24)		
J 4	Jack,(DF1-2S2.5R24)		
J 5	Jack,(U-SB1003)		
J 6	Jack,(DF1-8S2.5R24)		
J 7	Cable, (HIF3BA5B-34DAA26S)		
J 8	Terminal,(44E87532)		
J 9	Terminal,(ML-9DE(2P))		
J 10	Jack,(DF1-2S2.5R24)		
J 11	Receptacle, (BNC-R-101-NI)		
J 12	Receptacle, (BNC-R-101-NI)		
J 13	Receptacle, (BNC-R-101-NI)		
J 14	Receptacle, (BNC-R-101-NI)		
J 15	Receptacle, (BNC-R-101-NI)		
J 16	Receptacle, (BNC-R-101-NI)		OPT 03
J 17	Receptacle, (BNC-R-101-NI)		OPT 03
J 18	Receptacle, (BNC-R-101-NI)		
J 19	Jack,(DF1-2S2.5R24)		
J 20	Cable,(CNF3-20D-AA030S)		
J 21	Inlet,(NC-165)		

( ): Manufacturer's part number
* : Selected at factory

Parts List: DIGITAL TRANSMISSION ANALYZER ME3401A RECEIVER 10

CKT REF	DESCRIPTION	RATING	NOTE
J 22	Jack,(DF1-10S2.5R24)		
J 23	Jack,(DF1-10S2.4R24)		OPT 03
J 24	Jack,(DF1-3S2.4R24)		OPT 03
J 25	Jack,(DF1-2S2.5R24)		OPT 03
J 26	Jack,(44J84152)		OPT 03
S 1	Switch,(ESB-76)		
S 2	Switch,(8E3011)		
S 3	Switch,(SLBL222C-B)		
T 1	Power,(44T88343)	123VA	OPT 03
Z 1	Line filter, (MBW-1202-33)		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING	NOTE
B 1	Buzzer,(KMB-06)		
C 1	Elect,(SME80LISS-1000050D)	10000μF,±20%,80V	
C 2	Elect,(CE04C1J100A)	10μF,±20%,63V	
C 3	Elect,(CE04C1V221A)	220μF,±20%,35V	
C 4	Elect,(CE04C1E470A)	47μF,±20%,25V	
C 5	Elect,(CE04C1V221A)	220μF,±20%,35V	
C 6	Elect,(SXE35VB-680 φ12.5 x 25)	680μF,±20%,35V	
C 7	Elect,(SXE25VB-1000 φ12.5 x 25)	1000μF,±20%,25V	
C 8	Elect,(SXE25VB-1000 φ12.5 x 25)	1000μF,±20%,25V	
C 9	Elect,(SXE16VB-1500 φ12.5 x 25)	1500μF,±20%,16V	
C 10	Elect,(SXE16VB-1500 φ12.5 x 25)	1500μF,±20%,16V	
C 11	Elect,(SXE16VB-1500 φ12.5 x 25)	1500μF,±20%,16V	
C 12	Elect,(SXE50VB-2200 φ18 x 40)	2200μF,±20%,50V	
C 13	Elect,(CE04C1V102A)	1000μF,±20%,35V	
C 14	Elect,(CE04C1E221A)	220μF,±20%,25V	
C 15	Elect,(CE04C1J470A)	47μF,±20%,63V	
C 16	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V	
C 17	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 18	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 19	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 20	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 21	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 23	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 25	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 26	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 27	Not assigned		
C 28	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 29	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 30	Elect,(CE04C1H2R2A)	2.2μF,±20%,50V	
C 31	Elect,(CE04C1H2R2A)	2.2μF,±20%,50V	
C 32	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 33	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 34	Elect,(CE04C1E101A)	100μF,±20%,25V	
C 35	Elect,(CE04C1E101A)	100μF,±20%,25V	
C 36	Elect,(CE04C1V102A)	1000μF,±20%,35V	

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING	NOTE
C 37	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 38	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 39	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 40	Cer,(CC924CH1H470J)	47pF,±5%,50V	
C 41	Cer,var,(TZ03R300A)	5.2 to 30pF,100V	
C 42 to C 60	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
F 1	Fuse, (MF51NN250V6.3ADC01)	6.3A,250V	
F 2	Fuse,(MF51NN250V1ADC01)	1A,250V	
F 3	Fuse,(MF51NN250V1ADC01)	1A,250V	
F 4	Fuse,(MF51NN250V5ADC01)	5A,250V	
F 5	Fuse,(MF51NN250V2ADC01)	2A,250V	
F 6	Fuse, (MF51NN250V1.6ADC01)	1.6A,250V	
J 1	Plug,(DF1-15P2.5DSA)	15pins	
J 2	Plug,(DF1-2P2.5DSA)	2pins	
J 3	Plug,(DF1-2P2.5DSA)	2pins	
J 4	Plug,(CNF3-34P-2.54DSA)	34pins	
J 5	Cable,(CNF23-40D-AA20S)		
J 6	Plug,(CNF3-40P-2.54DSA)	40pins	
J 7	Plug,(CNF3-34P-2.54DSA)	34pins	
J 8	Plug,(CNF3-20P-2.54DSA)	20pins	
K 1	Relay,(OHD3-90M)		
L 1	Coil,(SK-17C-045-650)	650μH	
L 2	Coil,(SK-17C-045-650)	650μH	
L 3	Coil,(SK-17C-045-650)	650μH	
L 4	Coil,(SK-24S-110-100)	100μH	
L 5	Coil,(SK-24S-110-100)	100μH	
L 6	Coil,(SK-21C-070-180)	180μH	
L 7	Coil,(SK-24S-045-3500W)	3.5mH	
M 1	Not assigned		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING		NOTE
Q 1	IC,(μPC494C)			
Q 2	IC,(μPC1251C)			
Q 3	IC,(μPC393C)			
Q *	Tr,(2SC3179)			
Q 5	Tr,(2SA1154)			
Q 6	Tr,(2SC3220)			
Q 7	Tr,(2SC3220)			
Q 8	Photo coupler,(PC618)			
Q 9	Photo coupler,(PC817X)			
Q 10	Not assigned			
Q 11	Rectifier, (D5FB20(4002))			
Q 12	Rectifier,(RB-152-LFB)			
Q 13	Rectifier,(V03G)			
Q 14	Rectifier,(V19E-1)			
Q 15	Rectifier,(V19E-1)			
Q 16	Rectifier,(V19E-1)			
Q 17	Rectifier,(V19E-1)			
Q 18	Rectifier,(V19E-1)			
Q 19	Rectifier,(V19E-1)			
Q 20	Rectifier,(D5LC20U-4000)			
Q 21	Rectifier,(D5LC20U-4000)			
Q 22	Rectifier,(D5LC20UR-4000)			
Q 23	Rectifier,(D10SC4M)			
Q 24	Rectifier,(D10SC4MR)			
Q 25	Rectifier,(D5LC20U-4000)			
Q 26	Not assigned			
Q 27	Not assigned			
Q 28	Di,breakdown,(RD5.1E)	4.8 to 5.37V,500mW		
Q 29	Di,breakdown,(RD13E)	12.11 to 13.66V, 500mW		
Q 30	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 31	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 32	Di,(1S955)			
Q 33	Di,(1S955)			
Q 34	Di,(1S953)			
Q 35	IC,(μPC14324H)			
Q 36	IC,(SI-3122V)			
Q 37	IC,(μPC16312H)			
Q 38	Not assigned			
Q 39	Not assigned			
Q 40	Di,(1S953)			
Q 41	Di,(1S953)			
Q 42	Not assigned			
Q 43	Not assigned			
Q 44	Not assigned			
Q 45	IC,(74LS245)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING		NOTE
Q 46	IC,(μPD8279C-2)			
Q 47	IC,(μPD8279C-2)			
Q 48	IC,(EPROM32KX8-20C)			
Q 49	IC,(EPROM32KX8-20C)			
Q 50	IC,(EPROM32KX8-20C)			
Q 51	IC,(EPROM32KX8-20C)			
Q 52	IC,(SRAM32KX8-C)			
Q 53	IC,(RP5C15P)			
Q 54	IC,(74LS74A)			
Q 55	IC,(74LS245)			
Q 56	IC,(7437)			
Q 57	IC,(74LS74A)			
Q 58	IC,(LH0080B)			DILB40P-8J
Q 59	IC,(74LS14)			
Q 60	IC,(74LS244)			
Q 61	IC,(74LS244)			
Q 62	Not assigned			
Q 63	IC,(74LS74A)			
Q 64	IC,(74LS139)			
Q 65	IC,(74LS138)			
Q 66	IC,(74LS08)			
Q 67	IC,(TC74HC00P)			
Q 68	IC,(74LS155)			
Q 69	IC,(74LS32)			
Q 70	IC,(MB3771)			
Q 71	IC,(74LS04)			
Q 72	IC,(74LS123)			
Q 73	IC,(μPD8259AC-2)			
Q 74	Not assigned			
Q 75	Not assigned			
Q 76	IC,(74LS245)			
Q 77	IC,(74LS244)			
Q 78	IC,(μPD71055C-10)			
Q 79	IC,(μPD71055C-10)			
Q 80	IC,(74LS244)			
Q 81	IC,(74LS244)			
R 1	MF,(RS1FB4.7KΩJ)	4.7kΩ,±5%,1W		
R 2	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 3	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 4	MF,(RN14K2E101J)	0.1kΩ,±5%,1/2W		
R 5	CF,(ARD25T123J)	12kΩ,±5%,1/4W		
R 6	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 7	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 8	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 9	CF,(ARD25T102J)	1kΩ,±5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING		NOTE
R 10	MF,(RN14K2H470J)	47Ω,±5%,1/2W		
R 11	MF,(RN14K2H100J)	10Ω,±5%,1/2W		
R 12	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 13	MF,(RN14K2H470J)	47Ω,±5%,1/2W		
R 14	MF,(RN14K2H100J)	10Ω,±5%,1/2W		
R 15	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 16	MF,(RS2FB220ΩJ)	220Ω,±5%,1W		
R 17	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W		
R 18	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 19	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 20	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 21	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 22	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 23	MF,(RN14K2H102J)	1kΩ,±5%,1/2W		
R 24	MF,(RN14K2H102J)	1kΩ,±5%,1/2W		
R 25	MF,(RN14K2H101J)	0.1kΩ,±5%,1/2W		
R 26	MF,(RN14K2H101J)	0.1kΩ,±5%,1/2W		
R 27	Not assigned			
R 28	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 29	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 30	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 31	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 32	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 33	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R * 34	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 35	Not assigned			
R 36	Not assigned			
R 37	Not assigned			
R 38	MF,(RS2FB1KΩJ)	1kΩ,±5%,1W		
R 39	MF,(RS2FB1KΩJ)	1kΩ,±5%,1W		
R 40	CM,var,(RJ-6P 500Ω)	500Ω,1/2W		
R 41	Not assigned			
R 42	Not assigned			
R 43	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 44	MF,(RS2FB22ΩJ)	22Ω,±5%,2W		
R 45	MF,(RN14K2E2741D)	2.74kΩ,±0.5%,1/4W		
R 46	MF,(RN14K2E1001D)	1kΩ,±0.5%,1/4W		
R 47	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 48	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 49	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 50	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 51	Not assigned			
R 52	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 53	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 54	SIP type,(RRS-4-103JA)	10kΩ x 4,±5%,1/8W		
R 55	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 56	SIP type,(RRS-4-103JA)	10kΩ x 4,±5%,1/8W		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING		NOTE
R 57	MF,(RS2FB22ΩJ)	22Ω,±5%,2W		
R 58	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 59	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 60	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
T 1	Trans,(44T75381)			
T 2	Trans,(44T75381)			
T 3	Trans,(439T36050)			
X 1	XTAL,(MX-38)	32.768KHz		
Z 1	XTAL OSC,(TD308C)	8MHz		
Z 2	Battery,(BR-AE2SP)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 2	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 3	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 4	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 5	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 6	Not assigned			
C 7 to C 19	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 20	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 21	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 23	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 25	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 26	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C 27	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 28	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 29	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 30	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 31	Elect,(CE04C1V330A)	33μF,±20%,35V		
C 32	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 33	Not assigned			
C 34	Not assigned			
C 35	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 36	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 37	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 38	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 39	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 40	Not assigned			
C 41	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 42	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 43	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 44	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 45	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 46	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 47	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 48	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 49	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 50	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 51	Cer,(RPE110CK0R5C50)	0.5pF,±0.25pF,50V		
C 52	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 53	Cer,(CC45CH1H151JY)	150pF,±5%,50V		
C 54	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 55	Cer,(CC924CH1H391J)	390pF,±5%,50V		
C 56	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 57	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
C 58	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 59	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 60	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 61	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 62	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 63	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C 64	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 65	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C 66	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 67	Cer,(RPE113F105Z50)	1μF,+80/-20%,50V		
C 68 to C 78	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 79	Cer,(CC45CH1H*JY)	11 to 30pF,±5%,50V		*18pF
C 80	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 81	Not assigned			
C 82 to C 93	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 94	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C 95	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 96	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 97	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 98	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 99	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C100	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C101	Elect,(CE04C1C331A)	330μF,±20%,16V		
C102	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C103	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C104	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C105	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C106	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C107	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C108	Elect,(CE04C1C331A)	330μF,±20%,16V		
C109	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C110	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C111	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C112	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C113	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C114	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C115	Elect,(CE04C1C331A)	330μF,±20%,16V		
C116	Elect,(CE04C1C331A)	330μF,±20%,16V		
C117	Elect,(CE04C1C331A)	330μF,±20%,16V		
C118	Elect,(CE04C1C331A)	330μF,±20%,16V		
C119	Elect,(CE04C1C331A)	330μF,±20%,16V		
C120	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C121	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
C122	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C123	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C124	Elect,(CE04C1H100A)	10μF,±20%,50V		
C125	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C126	Elect,(CE04C1H100A)	10μF,±20%,50V		
C127	Elect,(CE04C1H100A)	10μF,±20%,50V		
C128	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C129	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C130	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C131	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C132	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C133	Elect,(CE04C1H100A)	10μF,±20%,50V		
C134	Elect,(CE04C1H100A)	10μF,±20%,50V		
C135	Elect,(CE04C1H100A)	10μF,±20%,50V		
C136	Elect,(CE04C1H100A)	10μF,±20%,50V		
C137	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C138	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C139	Elect,(CE04C1E101A)	100μF,±20%,25V		
C140	Elect,(CE04C1E101A)	100μF,±20%,25V		
C141	Elect,(CE04C1E101A)	100μF,±20%,25V		
C142	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C143	Not assigned			
C144	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C145	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C146	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C147	Not assigned			
C148	Not assigned			
C149	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C150	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C151	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C152	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C153	Cer,(CC924CH1H470J)	47pF,±5%,50V		
C154	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C155	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C156	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C157	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C158	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C159	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
J 1	Plug,(DF1-2P2.5DSA)	2pins		
J 2	Plug,(U-PB1021)			
J 3	Cable,(CNF23-40D-AA20SX)			
J 4	Plug,(CNF3-26P-2.54DS)	26pins		
J 5	Receptacle,(BNC-R-NI)			
J 6	Receptacle,(BNC-R-NI)			
J 7	Receptacle,(JACK238)			

[ ]: Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
J 8	Receptacle,(BNC-R-NI)			
J 9	Plug,(DF1-8P2.5DSA)	8pins		
J 10	Plug,(DF1-10P2.5DSA)	10pins		
J 11	Connector,(DIC-149-3P)			
J 12	Connector,(DIC-128)			
K 1	Relay,(SVR-5V)			
K 2	Relay,(SVR-5V)			
K 3	Relay,(SVR-5V)			
K 4	Relay,(SVR-5V)			
L 1	Coil,(SP0408-R47K)	0.47μH,±10%		
L 2	Coil,(SP0408-3R3K)	3.3μH,±10%		
L 3	Coil,(SP0408-4R7K)	4.7μH,±10%		
L 4	Coil,(SP0408-120K)	120μH,±10%		
Q 1	Di,vari-cap,(FC-51M)			
Q 2	Di,vari-cap,(FC-51M)			
Q 3	Di,vari-cap,(FC-51M)			
Q 4	Tr,(2SC1907)			
Q 5	Tr,(2SC1907)			
Q 6	Tr,(2SC1907)			
Q 7	Tr,(2SC1907)			
Q 8	Tr,(2SC1907)			
Q 9	Tr,(2SC1907)			
Q 10	Tr,(2SC1907)			
Q 11	Di,(1S953)			
Q 12	Di,(1S953)			
Q 13	Tr,(2SC1907)			
Q 14	FET,(3SK59)			
Q 15	Tr,(2SC1907)			
Q 16	Tr,(2SC1907)			
Q 17	IC,(uPC151C)			
Q 18	Tr,(2SC2498)			
Q 19	Di,(1S953)			
Q 20	Di,(1S953)			
Q 21	Tr,(2SC1907)			
Q 22	Di,(1S953)			
Q 23	Di,breakdown,(RD6.2E)	5.78 to 6.44V,500mW		
Q 24	Di,(1S953)			
Q 25	Tr,(2SC2498)			
Q 26	Tr,(2SC2498)			
Q 27	IC,(10102)			
Q 28	Di,(1S953)			
Q 29	Di,breakdown,(RD6.2E)	5.78 to 6.44V,500mW		

[ ]: Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
Q 30	Tr,(2SC1907)			
Q 31	Di,(1S953)			
Q 32	Tr,(2SC1907)			
Q 33	Tr,(2SC1907)			
Q 34	Tr,(2SC2498)			
Q 35	Tr,(2SC2498)			
Q 36	IC,(10102)			
Q 37	Di,(1S953)			
Q 38	Tr,(2SC1907)			
Q 39	IC,(74LS139)			
Q 40	Not assigned			
Q 41	Not assigned			
Q 42	IC,(74LS38)			
Q 43	Not assigned			
Q 44	IC,(74LS04)			
Q 45	IC,(74LS08)			
Q 46	IC,(74LS290)			
Q 47	IC,(74LS51)			
Q 48	IC,(μPC1656C)			
Q 49	IC,(μPC1656C)			
Q 50	Tr,(2SC1907)			
Q 51	Di,(1S953)			
Q 52	Tr,(2SC2498)			
Q 53	Tr,(2SC2498)			
Q 54	Di,(1S953)			
Q 55	Tr,(2SC2498)			
Q 56	Tr,(2SC2498)			
Q 57	Di,(1S953)			
Q 58	Di,(1S953)			
Q 59	IC,(10116)			
Q 60	IC,(10111)			
Q 61	IC,(10105)			
Q 62	IC,(10125)			
Q 63	IC,(MC10H105)			
Q 64	FET,(3SK47K)			
Q 65	IC,(MC10H105)			
Q 66	FET,(3SK47K)			
Q 67	IC,(MC10H105)			
Q 68	FET,(3SK47K)			
Q 69	FET,(3SK47K)			
Q 70	IC,(10125)			
Q 71	IC,(10124)			
Q 72	IC,(10124)			
Q 73	IC,(μPC151C)			
Q 74	Di,breakdown,(RD6.2E)	5.78 to 6.44V,500mW		
Q 75	Di,(1S953)			
Q 76	Tr,(2SC1907)			

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
Q 77	Tr,(2SC1907)			
Q 78	Tr,(2SA1206)			
Q 79	Tr,(2SA1206)			
Q 80	Not assigned			
Q 81	Tr,(2SA1206)			
Q 82	Di,(1S953)			
Q 83	Di,breakdown,(RD3.6E)	3.4 to 3.845V,500mW		
Q 84	Tr,(2SA1206)			
Q 85	Tr,(2SA1206)			
Q 86	Not assigned			
Q 87	Tr,(2SA1206)			
Q 88	Not assigned			
Q 89	Tr,(2SC1907)			
Q 90	IC,(AB109CSP)			
Q 91	IC,(μPD7011C)			
Q 92	IC,(74S04)			
Q 93	IC,(74F74)			
Q 94	IC,(74F02)			
Q 95	IC,(74F175)			
Q 96	IC,(μPD8255AC-2)			
Q 97	IC,(74LS245)			
Q 98	IC,(74F175)			
Q 99	IC,(74F74)			
Q100	IC,(74F74)			
Q101	IC,(74LS393)			
Q102	IC,(74F00)			
Q103	IC,(74F74)			
Q104	IC,(74F74)			
Q105	IC,(74LS393)			
Q106	IC,(μPD8255AC-2)			
Q107	IC,(74LS244)			
Q108	IC,(74LS123)			
Q109	IC,(74F153)			
Q110	IC,(74LS293)			
Q111	IC,(74S00)			
Q112	IC,(74LS157)			
Q113	IC,(74LS02)			
Q114	IC,(74LS244)			
Q115	IC,(74LS123)			
Q116	IC,(74LS123)			
Q117	IC,(74LS00)			
Q118	IC,(74LS153)			
Q119	IC,(74LS123)			
Q120	IC,(μPD8253C-2)			
Q121	IC,(μPD8253C-2)			
Q122	IC,(μPD8253C-2)			
Q123	IC,(μPD8253C-2)			

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
Q124	IC,(74LS138)			
Q125	IC,(74LS21)			
Q126	IC,(74LS08)			
Q127	IC,(74LS74)			
Q128	IC,(74LS123)			
Q129	IC,(74LS08)			
Q130	Di,(1S953)			
Q131	Tr,(2SC1907)			
Q132	IC,(74F74)			
R 1	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 2	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W		
R 3	CF,(ARD25T333J)	33kΩ,±5%,1/4W		
R 4	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 5	CF,(ARD25T150J)	15Ω,±5%,1/4W		
R 6	CF,(ARD25T750J)	75Ω,±5%,1/4W		
R 7	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 8	CF,(ARD25T333J)	33kΩ,±5%,1/4W		
R 9	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 10	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 11	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 12	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 13	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 14	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 15	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 16	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 17	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 18	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 19	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 20	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 21	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 22	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 23	CF,(ARD25T750J)	75Ω,±5%,1/4W		
R 24	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 25	Not assigned			
R 26	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 27	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 28	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 29	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R 30	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 31	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 32	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 33	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 34	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 35	Not assigned			
R 36	CF,(ARD25T471J)	470Ω,±5%,1/4W		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
R 37	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R 38	CF,(ARD25T100J)	10Ω,±5%,1/4W		
R 39	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 40	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 41	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 42	CF,(ARD25T153J)	15kΩ,±5%,1/4W		
R 43	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 44	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 45	CF,(ARD25T301J)	300Ω,±5%,1/4W		
R 46	CF,(ARD25T510J)	51Ω,±5%,1/4W		
R 47	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 48	CF,(ARD25T105J)	1MΩ,±5%,1/4W		
R 49	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W		
R 50	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 51	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 52	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 53	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W		
R 54	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 55	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 56	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 57	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 58	Not assigned			
R 59	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 60	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 61	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 62	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R 63	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 64	CF,(ARD25T330J)	33Ω,±5%,1/4W		
R 65	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 66	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 67	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 68	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W		
R 69	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		
R 70	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		
R 71	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 72	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R 73	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		
R 74	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 75	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 76	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 77	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W		
R 78	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 79	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 80	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 81	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 82	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W		
R 83	MF,(RN14K2E1000D)	100Ω,±0.5%,1/4W		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
R 84	MF,(RN14K2E4640D)	464Ω,±0.5%,1/4W		
R 85	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 86	MF,(RN14K2H221J)	0.22kΩ,±5%,1/2W		
R 87	CF,(ARD25T750J)	75Ω,±5%,1/4W		
R 88	SIP type,(RRS-4-681JA)	680Ω x 4,±5%,1/8W		
R 89	Not assigned			
R 90	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 91	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 92	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 93	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 94	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 95	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W		
R 96	MF,(RN14K2E1000D)	100Ω,±0.5%,1/4W		
R 97	CF,(ARD25T822J)	8.2kΩ,±5%,1/4W		
R 98	MF,(RN14K2E3920D)	392Ω,±0.5%,1/4W		
R 99	CF,(ARD25T750J)	75Ω,±5%,1/4W		
R100	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R101	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R102	CF,(ARD25T821J)	820Ω,±5%,1/4W		
R103	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R104	CF,(ARD25T182J)	1.8kΩ,±5%,1/4W		
R105	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R106	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R107	CM,var,(RJ-6P 500Ω)	500Ω,1/2W		
R108	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R109	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R110	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R111	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R112	MF,(RN14K2H680J)	68Ω,±5%,1/2W		
R113	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R114	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R115	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R116	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W		
R117	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R118	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		
R119	CF,(ARD25T510J)	51Ω,±5%,1/4W		
R120	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R121	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R122	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R123	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R124	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R125	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R126	CF,(ARD25T750J)	75Ω,±5%,1/4W		
R127	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R128	CF,(ARD25T821J)	820Ω,±5%,1/4W		
R129	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R130	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
R131	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R132	CF,(ARD25T750J)	75Ω,±5%,1/4W		
R133	CF,(ARD25T392J)	3.9kΩ,±5%,1/4W		
R134	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R135	Not assigned			
R136	Not assigned			
R137	Not assigned			
R138	Not assigned			
R139	Not assigned			
R140	Not assigned			
R141	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R142	SIP type,(RRS-4-681JA)	680Ω x 4,±5%,1/8W		
R143	CF,(ARD25TJ330J)	33Ω,±5%,1/4W		
R144	CM,var,(RJ-6P 20Ω)	20Ω,1/2W		
R145	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R146	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R147	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R148	SIP type,(RRS-4-681JA)	680Ω x 4,±5%,1/8W		
R149	CF,(ARD25TJ331J)	330Ω,±5%,1/4W		
R150	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R151	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R152	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R153	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R154	CF,(ARD25T820J)	82Ω,±5%,1/4W		
R155	CM,var,(RJ-6P 50Ω)	50Ω,1/2W		
R156	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R157	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R158	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R159	SIP type,(RRS-4-681JA)	680Ω x 4,±5%,1/8W		
R160	CF,(ARD25T121J)	120Ω,±5%,1/4W		
R161	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R162	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R163	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W		
R164	CF,(ARD25T680J)	68Ω,±5%,1/4W		
R165	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R166	CM,var,(RJ-6P 50Ω)	50Ω,1/2W		
R167	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R168	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R169	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R170	CF,(ARD25T680J)	68Ω,±5%,1/4W		
R171	Not assigned			
R172	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R173	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R174	CF,(ARD25T820J)	82Ω,±5%,1/4W		
R175	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R176	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R177	CF,(ARD25T221J)	220Ω,±5%,1/4W		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
R178	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R179	MF,(RN14K2E7680D)	768Ω,±0.5%,1/4W		
R180	CM,var,(RJ-6P 50Ω)	50Ω,1/2W		
R181	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R182	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R183	CF,(ARD25T820J)	82Ω,±5%,1/4W		
R184	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R185	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R186	CM,var,(RJ-6P 10KΩ)	10kΩ,1/2W		
R187	MF,(RN14K2E4991D)	4.99kΩ,±0.5%,1/4W		
R188	CM,var,(RJ-6P 100KΩ)	100kΩ,1/2W		
R189	MF,(RN14K2E2001D)	2kΩ,±0.5%,1/4W		
R190	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W		
R191	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R192	MF,(RN14K2H391J)	0.39kΩ,±5%,1/2W		
R193	MF,(RN14K2H391J)	0.39kΩ,±5%,1/2W		
R194	SIP type,(RRS-4-103JA)	10kΩ x 4,±5%,1/8W		
R195	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R196	MF,(RN14K2E1210D)	121Ω,±0.5%,1/4W		
R197	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R198	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R199	CF,(ARD25T182J)	1.8kΩ,±5%,1/4W		
R200	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R201	MF,(RN14K2E1210D)	121Ω,±0.5%,1/4W		
R202	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R203	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R204	CF,(ARD25T182J)	1.8kΩ,±5%,1/4W		
R205	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R206	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R207	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R208	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R209	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R210	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R211	CF,(ARD25T511J)	510Ω,±5%,1/4W		
R212	Not assigned			
R213	Not assigned			
R214	Not assigned			
R215	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R216	Not assigned			
R217	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		
R218	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R219	CF,(ARD25T511J)	510Ω,±5%,1/4W		
R220	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R221	Not assigned			
R222	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R223	Not assigned			
R224	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
R225	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R226	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R227	Not assigned			
R228	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		
R229	CF,(ARD25T182J)	1.8kΩ,±5%,1/4W		
R230	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R231	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R232	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R233	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R234	Not assigned			
R235	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R236	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R237	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R238	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R239	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R240	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R241	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R242	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R243	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R244	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R245	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R246	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R247	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R248	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R249	Not assigned			
R250	Not assigned			
R251	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R252	CF,(ARD25T111J)	110Ω,±5%,1/4W		
R253	CF,(ARD25TJ332J)	3.3kΩ,±5%,1/4W		
R254	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R255	Not assigned			
R256	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R257	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R258	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R259	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R260	CF,(ARD25TJ331J)	330Ω,±5%,1/4W		
R261	CF,(ARD25TJ331J)	330Ω,±5%,1/4W		
R262	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R263	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R264	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R265	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R266	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R267	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R268	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W		
S 1	DIP,(51D-0401)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING	NOTE
T 1	Trans,(342T67152C)		
Z 1	Delay line,(AT-08)		
Z 2	Delay line,(AT-08)		
Z 3	Delay line,(AT-04)		
Z 4	Delay line,(AT-50)		
Z 5	Delay line,(AT-30)		
Z 6	Delay line,(AN-150)		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A3 R-DISPLAY (RECEIVER) 13

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(KME10T-220M)	220uF,±20%,10V	
C 2	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 3	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 4	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 5	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 6	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 7	Elect,(KME10T-220M)	220uF,±20%,10V	
C 8	Elect,(KME10T-220M)	220uF,±20%,10V	
C 9	Elect,(KME10T-220M)	220uF,±20%,10V	
C 10	Elect,(KME10T-220M)	220uF,±20%,10V	
J 1	Plug,(CNF3-40P-2.54DSA)	40pins	
Q 1	Not assigned		
Q 2	IC,(74LS139)		
Q 3	IC,(74HC238)		
Q 4	IC,(TD62381P)		
Q 5	IC,(TD62785AP)		
Q 6	IC,(74HC238)		
Q 7	IC,(TD62381P)		
Q 8	Not assigned		
Q 9	IC,(74HC238)		
Q 10	IC,(TD62785AP)		
Q 11	IC,(TD62381P)		
Q 12	Not assigned		
Q 13	IC,(LN442YPH)		
Q 14 to Q 61	LED,(TLG209)		
Q 62	LED,(LN210RP)		
Q 63	LED,(LN210RP)		
Q 64	LED,(LN210RP)		
Q 65	LED,(LN210RP)		
Q 66	LED,(LN210RP)		
Q 67	LED,(LN410YP)		
Q 68	LED,(LN410YP)		
Q 69	LED,(LN410YP)		
Q 70	LED,(LN410YP)		
Q 71	LED,(LN410YP)		
Q 72	LED,(LN210RP)		
Q 73	LED,(LN310GP)		
Q 74	LED,(LT9200N)		
Q 75	LED,(LT9200N)		
Q 76	LED,(LT9200N)		
Q 77	Not assigned		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A3 R-DISPLAY (RECEIVER) 13

CKT REF	DESCRIPTION	RATING	NOTE
Q 78 to Q 93	Not assigned Not assigned IC,(LN513GK)		
R 1	CF,(ARD25T621J)	620Ω,±5%,1/4W	
R 2	CF,(ARD25T330J)	33Ω,±5%,1/4W	
R 3	SIP type,(RRS-6-223JA)	22kΩ x 6,±5%,1/8W	
R 4	SIP type,(RRS-6-223JA)	22kΩ x 6,±5%,1/8W	
R 5	SIP type,(RRS-7-330JB)	33Ω x 7,±5%,1/8W	
R 6	SIP type,(RRS-7-330JB)	33Ω x 7,±5%,1/8W	
R 7	SIP type,(RRS-4-223JA)	22kΩ x 4,±5%,1/8W	
R 8	SIP type,(RRS-7-330JB)	33Ω x 7,±5%,1/8W	
R 9	CF,(ARD25T330J)	33Ω,±5%,1/4W	
S 1 to S 22	Switch,(TM1-01)		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 2	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 3	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 4	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 5	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 6	Elect,(CE04C1C331A)	330uF,±20%,16V	
C 7	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 8	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 9	Not assigned		
C 10	Cer,(CC924CH1H560J)	56pF,±5%,50V	
C 11	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V	
C 12	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 13	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 14	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 15	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 16	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 17	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 18	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 19	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 20	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 21	Not assigned		
C 22	Plast,(ECQ-P1103FZ)	0.01uF,±1%,100V	
C 23	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 24	Elect,(CE04C1E101A)	100uF,±20%,25V	
C 25	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 26	Elect,(CE04C1C331A)	330uF,±20%,16V	
C 27	Elect,(CE04C1C331A)	330uF,±20%,16V	
C 28	Elect,(CE04C1C331A)	330uF,±20%,16V	
C 29	Elect,(CE04C1C331A)	330uF,±20%,16V	
C 30	Elect,(CE04C1C331A)	330uF,±20%,16V	
C 31	Elect,(CE04C1C331A)	330uF,±20%,16V	
C 32	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 33	Elect,(CE04C1C331A)	330uF,±20%,16V	
C 34	Elect,(CE04C1C331A)	330uF,±20%,16V	
C 35	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 36	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 37	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 38	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 39	Cer,(CC924CH1H221J)	220pF,±5%,50V	
C 40	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 41	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 42	Elect,(CE04C1H2R2A)	2.2uF,±20%,50V	
C 43	Elect,(CE04C1E470A)	47uF,±20%,25V	
C 44	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 45	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 46	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 47	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING	NOTE
C 48	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 49	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 50	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 51	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 52	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C [illegible]	Plast,(ECQ-P1332FZ)	3300pF,±1%,100V	
C 54	Plast,(ECQ-P1241FZ)	2400pF,±1%,100V	
C 55	Cer,(RPE111CH5[illegible])	510pF,±2%,50V	
C 56	Plast,(ECQ-P1181FZ)	1800pF,±1%,100V	
C 57	Plast,(ECQ-P1152FZ)	1500pF,±1%,100V	
C 58	Cer,(CC924CH1H331J)	330pF,±5%,50V	
C 59	Cer,(CC924CH1H821J)	820pF,±5%,50V	
C 60	Cer,(CC924CH1H621J)	620pF,±5%,50V	
C 61	Cer,(RPE111CH131G50)	130pF,±2%,50V	
C 62	Cer,(CC45CH1H151J)	150pF,±5%,50V	
C 63	Cer,(CC45CH1H101J)	100pF,±5%,50V	
C 64	Cer,(CC45CH1H100J)	10pF,±5%,50V	
C 65	Plast,(ECQ-P[illegible])	3300pF,±1%,100V	
C 66	Plast,(ECQ-P1242FZ)	2400pF,±1%,100V	
C 67	Cer,(RPE111CH511G50)	510pF,±2%,50V	
C 68	Plast,(ECQ-P1182FZ)	1800pF,±1%,100V	
C 69	Plast,(ECQ-P1152FZ)	1500pF,±1%,100V	
C 70	Cer,(CC924CH1H331J)	330pF,±5%,50V	
C 71	Cer,(CC924CH1H821J)	820pF,±5%,50V	
C 72	Cer,(CC924CH1H6[illegible])	6[illegible]pF,±5%,50V	
C 73	Cer,(RPE111CH131G50)	130pF,±2%,50V	
C 74	Cer,(CC45CH1H151J)	150pF,±5%,50V	
C 75	Cer,(CC45CH1H101J)	100pF,±5%,50V	
C 76	Cer,(CC45CH1H100J)	10pF,±5%,50V	
C 77	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 78	Plast,(ECQ-V1H105JW)	1uF,±5%,50V	
C 79	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 80	Cer,(CC45CH1H010CY)	1pF,±0.25pF,50V	
C 81	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 82	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 83	Plast,(ECQ-P1241FZ)	2400pF,±1%,100V	
C 84	Cer,(RPE111CH361G50)	360pF,±2%,50V	
C 85	Plast,(ECQ-P1242FZ)	2400pF,±1%,100V	
C 86	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 87	Plast,(ECQ-P1242FZ)	2400pF,±1%,100V	
C 88	Plast,(ECQ-P1103FZ)	0.01uF,±1%,100V	
C 89	Plast,(ECQ-P1103FZ)	0.01uF,±1%,100V	
C 90	Plast,(ECQ-P1[illegible]FZ)	0.[illegible]uF,±1%,100V	
C 91	Plast,(ECQ-V1H105JW)	1uF,±5%,50V	
C 92	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 93	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 94	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	

Manufacturer's part number
• : Selected at factory

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Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING	NOTE
C 95	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 96	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C 97	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V	
C 98	Cer,(CC45CH1H470JY)	47pF,±5%,50V	
C 99	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C100	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C101	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C102	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C103	Elect,(CE04C1E101A)	100uF,±20%,25V	
C104	Elect,(CE04C1E101A)	100uF,±20%,25V	
C105	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C106	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V	
C107	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V	
C108	Cer,(CC45CH1H060DY)	6pF,±0.5pF,50V	
C109	Cer,(CC45CH1H060DY)	6pF,±0.5pF,50V	
C110	Cer,(CC45CH1N220JY)	22pF,±5%,50V	
C111	Cer,(CC924CH1H471J)	470pF,±5%,50V	
C112	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V	
J 1	Cable,(CNF23-26D-AA10S)		
J 2	Plug,(DF1-2P-2.5DSA)	2pins	
J 3	Plug,(DF1-2P-2.5DSA)	2pins	
K 1	Relay,(SVR-5V)		
K 2	Relay,(SVR-5V)		
K 3	Relay,(SVR-5V)		
L 1	Coil,(10K17-85T)	0.358uH	
L 2	Coil,(LH1-332K)	3.3mH,±10%	
L 3	Coil,(LH1-332K)	3.3mH,±10%	
L 4	Coil,(LH1-152K)	1.5mH,±10%	
L 5	Coil,(LH1-152K)	1.5mH,±10%	
L 6	Coil,(LH1-152K)	1.5mH,±10%	
L 7	Coil,(LH1-821K)	820uH,±10%	
L 8	Coil,(LH1-821K)	820uH,±10%	
L 9	Coil,(LH1-821K)	820uH,±10%	
L 10	Coil,(LF8-391K)	390uH,±10%	
L 11	Coil,(LF8-121K)	120uH,±10%	
L 12	Coil,(LF8-121K)	120uH,±10%	
L 13	Coil,(LF8-560K)	56uH,±10%	
L 14	Coil,(LH1-332K)	3.3mH,±10%	
L 15	Coil,(LH1-332K)	3.3mH,±10%	
L 16	Coil,(LH1-152K)	1.5mH,±10%	
L 17	Coil,(LH1-152K)	1.5mH,±10%	

( ): Manufacturer's part number
• : Selected at factory.

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Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING	NOTE
L 18	Coil,(LH1-152K)	1.5mH,±10%	
L 19	Coil,(LH1-821K)	820uH,±10%	
L 20	Coil,(LH1-821K)	820uH,±10%	
L 21	Coil,(LH1-821K)	820uH,±10%	
L 22	Coil,(LF8-391K)	390uH,±10%	
L 23	Coil,(LF8-121K)	120uH,±10%	
L 24	Coil,(LF8-121K)	120uH,±10%	
L 25	Coil,(LF8-560K)	56uH,±10%	
Q 1	Tr,(2SC1907)		
Q 2	Tr,(2SA1206)		
Q 3	Tr,(2SA1206)		
Q 4	Tr,(2SA1206)		
Q 5	Tr,(2SA1206)		
Q 6	IC,(uPC1430SII)		
Q 7	Di,(1S953)		
Q 8	IC,(uPC151C)		
Q 9	IC,(NJU201AD)		
Q 10	IC,(NJU201AD)		
Q 11	IC,(10124)		
Q 12	IC,(uPD8255AC-2)		
Q 13	IC,(10116)		
Q 14	IC,(10105)		
Q 15	IC,(10131)		
Q 16	IC,(10102)		
Q 17	IC,(10102)		
Q 18	IC,(10131)		
Q 19	Tr,(2SC2718)		
Q 20	Tr,(2SC2718)		
Q 21	Tr,(2SC2718)		
Q 22	Tr,(2SC2718)		
Q 23	IC,(NJU201AD)		
Q 24	IC,(74LS14)		
Q 25	IC,(74LS20)		
Q 26	IC,(74LS393)		
Q 27	IC,(74LS393)		
Q 28	IC,(TD62003P)		
Q 29	IC,(74LS86)		
Q 30	IC,(74LS74)		
[illegible]	[illegible]		

( ): Manufacturer's part number
• : Selected at factory

[illegible]

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING	NOTE
Q 38	Not assigned		
Q 39	IC,(NJU201AD)		
Q 40	Tr,(2SC2718)		
Q 41	Tr,(2SC2718)		
Q 42	Tr,(2SC2718)		
Q 43	Tr,(2SC2718)		
Q 44	IC,(NJU201AD)		
Q 45	IC,(HAJ-2525-5)		
Q 46	IC,(uPC151C)		
Q 47	IC,(HAJ-2525-5)		
Q 48	Tr,(2SC2718)		
Q 49	Tr,(2SC2718)		
Q 50	Tr,(2SC2718)		
Q 51	Tr,(2SC2718)		
Q 52	IC,(HAJ-2525-5)		
Q 53	IC,(NJU201AD)		
Q 54	IC,(HAJ-2525-5)		
Q 55	IC,(HAJ-2525-5)		
Q 56	IC,(HAJ-2525-5)		
Q 57	IC,(uPC271C)		
Q 58	Di,breakdown,(1S252)	5.9 to 6.5V,250mW	
Q 59	IC,(uPC151C)		
Q 60	IC,(HA17012PC)		
Q 61	IC,(74LS191)		
Q 62	IC,(74LS191)		
Q 63	IC,(74LS191)		
Q 64	IC,(74LS123)		
Q 65	IC,(uPC271C)		
Q 66	IC,(uPC271C)		
Q 67	Tr,(2SC1907)		
Q 68	IC,(NJU201AD)		
Q 69	Not assigned		
Q 70	Not assigned		
Q 71	Not assigned		
Q 72	Not assigned		
Q 73	Not assigned		
Q 74	Not assigned		
Q 75	Not assigned		
Q 76	IC,(74LS74)		
R 1	CF,(ARD25T3J2J)	3.3kΩ,±5%,1/4W	
R 2	CF,(ARD25T3J2J)	3.3kΩ,±5%,1/4W	
R 3	CF,(ARD25T3J2J)	3.3kΩ,±5%,1/4W	
R 4	CF,(ARD25T3J2J)	3.3kΩ,±5%,1/4W	
R 5	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 6	CF,(ARD25T3J1J)	330Ω,±5%,1/4W	

Manufacturer's part number
• : Selected at factory

[illegible]

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING	NOTE
R 7	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 8	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 9	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 10	Not assigned		
R 11	Not assigned		
R 12	Not assigned		
R 13	Not assigned		
R 14	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 15	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 16	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R 17	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R 18	CM,var,(RJ-6P 5KΩ)	5kΩ,1/2W	
R 19	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 20	CF,(ARD25T333J)	33kΩ,±5%,1/4W	
R 21	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 22	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R 23	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R 24	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W	
R 25	SIP type,(RRS-8-681JA)	680Ω x 8,±5%,1/8W	
R 26	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W	
R 27	Not assigned		
R 28	Not assigned		
■ 29	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 30	CF,(ARD25T331J)	330Ω,±5%,1/4W	
■ 31	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 32	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 33	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 34	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 35	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 36	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 37	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 38	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 39	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 40	MF,(RN14K2E6810D)	681Ω,±0.5%,1/4W	
R 41	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 42	MF,(RN14K2E8060D)	806Ω,±0.5%,1/4W	
R 43	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 44	MF,(RN14K2E7680D)	768Ω,±0.5%,1/4W	
R 45	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 46	MF,(RN14K2E8060D)	806Ω,±0.5%,1/4W	
R 47	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 48	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 49	SIP type,(RRS-8-472JA)	4.7kΩ x 8,±5%,1/8W	
R 50	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 51	CF,(ARD25T683J)	68kΩ,±5%,1/4W	
R 52	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 53	CF,(ARD25T223J)	22kΩ,±5%,1/4W	

( ): Manufacturer's part number
• : Selected at factory

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING	NOTE
R 54	MF,(RN14K2E2151D)	2.15kΩ,±0.5%,1/4W	
R 55	MF,(RN14K2E2491D)	2.49kΩ,±0.5%,1/4W	
R 56	MF,(RN14K2E2151D)	2.15kΩ,±0.5%,1/4W	
R 57	MF,(RN14K2E2491D)	2.49kΩ,±0.5%,1/4W	
R 58	MF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W	
R 59	CF,(ARD25T474J)	470kΩ,±5%,1/4W	
R 60	Not assigned		
R 61	Not assigned		
R 62	CF,(ARD25T474J)	470kΩ,±5%,1/4W	
R 63	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W	
R 64	CF,(ARD25T820J)	82Ω,±5%,1/4W	
R 65	CF,(ARD25T131J)	130Ω,±5%,1/4W	
R 66	SIP type,(RRS-6-471JA)	470Ω x 6,±5%,1/8W	
R 67	SIP type,(RRS-8-471JA)	470Ω x 8,±5%,1/8W	
R 68	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 69	MF,(RN14K2E9090D)	909Ω,±0.5%,1/4W	
R 70	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 71	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 72	MF,(RN14K2E8060D)	806Ω,±0.5%,1/4W	
R 73	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 74	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 75	MF,(RN14K2E9090D)	909Ω,±0.5%,1/4W	
R 76	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 77	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 78	MF,(RN14K2E8660D)	866Ω,±0.5%,1/4W	
R 79	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 80	MF,(RN14K2E1691D)	1.69kΩ,±0.5%,1/4W	
R 81	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W	
R 82	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W	
R 83	MF,(RN14K2E1101D)	1.1kΩ,±0.5%,1/4W	
R 84	MF,(RN14K2E1101D)	1.1kΩ,±0.5%,1/4W	
R 85	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 86	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W	
R 87	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W	
R 88	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R 89	MF,(RN14K2E1072D)	10.7kΩ,±0.5%,1/4W	
R 90	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 91	MF,(RN14K2E5360D)	536Ω,±0.5%,1/4W	
R 92	MF,(RN14K2E2001D)	2kΩ,±0.5%,1/4W	
R 93	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 94	MF,(RN14K2E5361D)	5.36kΩ,±0.5%,1/4W	
R 95	MF,(RN14K2E1542D)	15.4kΩ,±0.5%,1/4W	
R 96	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 97	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 98	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 99	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R100	CF,(ARD25T103J)	10kΩ,±5%,1/4W	

( ): Manufacturer's part number
• : Selected at factory

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING	NOTE
R101	MF,(RN14K2E1002D)	10kΩ,±0.5%,1/4W	
R102	MF,(RN14K2E3311D)	3.31kΩ,±0.5%,1/4W	
R103	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R104	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W	
R105	MF,(RN14K2E3011D)	3.01kΩ,±0.5%,1/4W	
R106	MF,(RN14K2E2741D)	2.74kΩ,±0.5%,1/4W	
R107	Not assigned		
R108	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W	
R109	MF,(RN14K2E1691D)	1.69kΩ,±0.5%,1/4W	
R110	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R111	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R112	CF,(ARD25T154J)	150kΩ,±5%,1/4W	
R113	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W	
R114	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R115	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R116	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W	
R117	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R118	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R119	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R120	MF,(RN14K2E2001D)	2kΩ,±0.5%,1/4W	
R121	MF,(RN14K2E1331D)	1.33kΩ,±0.5%,1/4W	
R122	MF,(RN14K2E1331D)	1.33kΩ,±0.5%,1/4W	
R123	MF,(RN14K2E1331D)	1.33kΩ,±0.5%,1/4W	
R124	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R125	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R126	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R127	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R128	Not assigned		
R129	Not assigned		
R130	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R131	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R132	Not assigned		
R133	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R134	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
Z 1	XTAL OSC,(44X79277X)	22.368MHz	
Z 2	XTAL OSC,(44X79277AB)	25.248MHz	
Z 3	XTAL OSC,(44X79277W)	18.912MHz	
Z 4	XTAL OSC,(44X79277V)	18.528MHz	
Z 5	Delay line,(AT-10)		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 R-SWITCH (RECEIVER) 15

CKT REF	DESCRIPTION	RATING	NOTE
J 1	Plug,(CNF23-34D-AA30S)		
S 1	Switch,(SLEP223D-P)		
S 2	Not assigned		
S 3	Not assigned		
S 4	DIP,(51D-0801)		
S 5	DIP,(51D-0801)		
S 6	DIP,(51D-0801)		

( ): Manufacturer's part number
• Selected at factory

Parts List : A8 PRINTER UNIT 16

CKT REF	DESCRIPTION	RATING	NOTE
J 1	Connector, (DF1-5S-2.5R24)		
J 2	Connector, (DF1-5S-2.5R24)		
Z 1	PRINTER INTERFACE		44W85804
Z 2	PRINTER CONTROL		44W85805
Z 3	PRINTER, (FTP-020M008)		

( ): Manufacturer's part number
• : Selected at factory

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Parts List : Z1 in A8 PRINTER INTERFACE 17

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(CE04W1A471)	470µF,±20%,10V	
C 2	Elect,(CE04W1A471)	470µF,±20%,10V	
C 3	Elect,(CE04W1V101)	100µF,±20%,35V	
C 4	Cer,(CC924CH1H * J)	12 to 33pF,±5%,50V	•
C 5	Not assigned		
C 6	Not assigned		
C 7	Not assigned		
C 8	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 9	Cer,(CK924C1H103M)	0.01µF,±20%,50V	
C10	Cer,(CK924C1H103M)	0.01µF,±20%,50V	
C11	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C12	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C13	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C14	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C15	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C16	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C17	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C18	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C19	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C20	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C21	Cer,(CC924CH1H * J)	12 to 33pF,±5%,50V	•
C22	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C23	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C24	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C25	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C26	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C27	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
J 1	Connector, (HIF3-20P-2.54DS)	20P	
J 2	Connector, (FCN364J032)	32P	
J 3	Connector, (DF1-5P-2.5DSA)	5P	
J 4	Not assigned		
L 1	Coil,(LF8-101K)	100µH	
Q 1	IC,(74ALS574N)		
Q 2	IC,(74LS540)		
Q 3	IC,(74LS74A)		
Q 4	Not assigned		
Q 5	IC,(µPD8748D)		

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( ): Manufacturer's part number
• : Selected at factory

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Parts List : Z1 in A8 PRINTER INTERFACE 17

CKT REF	DESCRIPTION	RATING	NOTE
Q 6	IIC,(EPROM32X8-C)		
Q 7	IC,(74LS541)		
Q 8	IC,(µPD82C43C)		
Q 9	IC,(SN74ALS574N)		
Q10	IC,(M54563P)		
Q11	IC,(M54563P)		
Q12	IC,(µPC277C)		
Q13	IC,(74F537PC)		
Q14	Tr,(2SC1907)		
Q15	Tr,(2SD571)		
Q16	Tr,(2SB605)		
Q17	Tr,(2SD571)		
Q18	Tr,(2SB605)		
Q19	Tr,(2SC1907)		
Q20	Di,(1S953)		
Q21	Di,breakdown,(RD13E)	12.11 to 13.66V, 400mW	
Q22	IC,(TL770SCP-B)		
Q23	Tr,(2SD833)		
Q24	Tr,(2SD833)		
Q25	Tr,(2SD833)		
Q26	Tr,(2SD833)		
Q27	Tr,(2SD833)		
Q28	Tr,(2SD833)		
Q29	Tr,(2SD833)		
Q30	Tr,(2SD833)		
Q31	Tr,(2SD833)		
Q32	Tr,(2SD833)		
Q33	Not assigned		
Q34	Di,(µPA54H)		
Q35	Di,(µPA54H)		
Q36	Di,(1S953)		
Q37	Di,(1S953)		
Q38	Di,(1S953)		
Q39	Di,(1S953)		
Q40	Di,breakdown,(RD6.2EB)	5.78 to 6.44V,400mW	
R 1	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 2	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 3	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 4	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 5	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 6	Not assigned		
R 7	Not assigned		

M-1

( ): Manufacturer's part number
• : Selected at factory

44W85804 2/3

Parts List : Z1 in A8 PRINTER INTERFACE 17

CKT REF	DESCRIPTION	RATING	NOTE
R 8	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 9	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R10	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R11	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R12	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R13	CF,(ARD25T183J)	18kΩ,±5%,1/4W	
R14	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R15	CF,(ARD25T123J)	12kΩ,±5%,1/4W	
R16	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R17	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R18	CF,(ARD25T111J)	110Ω,±5%,1/4W	
R19	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R20	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R21	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R22	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R23	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R24	CF,(ARD25T123J)	12kΩ,±5%,1/4W	
R25	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R26	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R27	CF,(ARD25T111J)	110Ω,±5%,1/4W	
R28	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R29	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R30	Not assigned		
R31	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R32	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R33	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R34	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R35	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R36	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R37	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R38	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R39	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R40	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R41	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R42	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R43	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R44	MF,(RN14K2E1501D)	1.50kΩ,±0.5%,1/4W	
R45	Not assigned		
X 1	XTAL OSC,(TQC-208B)	6MHz	

M-1

( ): Manufacturer's part number
• : Selected at factory

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Parts List : 22 in A8 PRINTER CONTROL **18**

CKT REF	DESCRIPTION	RATING	NOTE
J 1	Connector, (DF1-5P-2.5DSA)		
Q 1	LED, (TLG226)		
S 1	Switch, (HL20-NS)		
S 2	Switch, (HL20-NS)		

( ): Manufacturer's part number
* : Selected at factory

44W85805 1/1

Parts List : A6 (Option 42) GP-IB **8**

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect, (CE02C1A470)	47uF, ±20%, 10V	
C 2	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 3	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 4	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 5	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 6	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 7	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 8	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
J 1	Pattern		
J 2	Connector, (57LE-20240-27CO-D35H)		
Q 1	IC, (75160A)		
Q 2	IC, (75162A)		
Q 3	IC, (uPD7210C)		
Q 4	IC, (74LS00)		
Q 5	IC, (74LS367A)		
Q 6	IC, (74LS240)		
Q 7	IC, (74LS74A)		
Q 8	IC, (74LS32)		
Q 9	IC, (74LS139)		
R 1	Single in-line array, (IHR-8-103JA)	10kΩ x 8, 1/8W	
S 1	Dip, (DP-8)		

( ): Manufacturer's part number
* : Selected at factory

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Parts List : A7 (Option 43) RS-232C **9**

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect, (CE02C1A470)	47uF, ±20%, 10V	
C 2	Elect, (CE02C1C330)	33uF, ±20%, 16V	
C 3	Elect, (CE02C1C330)	33uF, ±20%, 16V	
C 4	Cer, (CC924CH1H151J)	150pF, ±5%, 50V	
C 5	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 6	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 7	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 8	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 9	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C10	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C11	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C12	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C13	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
J 1	Pattern		
J 2	Connector, (DB-25SA-J4)		
Q 1	IC, (SN75189AN)		
Q 2	IC, (74LS240)		
Q 3	IC, (SN75188N)		
Q 4	IC, (uPD8251AFC)		
Q 5	IC, (74LS04)		
Q 6	IC, (74LS367A)		
Q 7	IC, (COM8146)		
Q 8	IC, (74LS139)		
R 1	Single in-line array, (IHR-8-103JA)	10kΩ x 8, 1/8W	
R 2	Single in-line array, (IHR-4-103JA)	10kΩ x 4, 1/8W	
S 1	Dip, (S-2031)		
S 2	Dip, (B-8A)		
X 1	XTAL OSC, (MX-5068)	5.0688MHz	

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A9 (Option 03) DS-1 OUTPUT **19**

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect, (CE04C1C331A)	330uF, ±20%, 16V	
C 2	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 3	Cer, (CE04C1C331A)	330uF, ±20%, 16V	
C 4	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 5	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 6	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 7	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 8	Cer, (CK924C1H472M)	4700pF, ±20%, 50V	
C 9	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 10	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 11	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 12	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 13	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 14	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 15	Elect, (CE04C1C331A)	330uF, ±20%, 16V	
C 16	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 17	Not assigned		
J 1	Plug, (DF1-10P2.5DSA)	10pins	
J 2	Plug, (DF1-3P2.5DSA)	3pins	
J 3	Plug, (DF1-2P2.5DSA)	2pins	
L 1	Coil, (LP8-470K)	47uH, ±10%	
Q 1	IC, (74HCT00P)		
Q 2	IC, (74HC393)		
Q 3	IC, (74HC74)		
Q 4	IC, (74HC393)		
Q 5	IC, (74HC74)		
Q 6	IC, (MC4044)		
Q 7	Not assigned		
Q 8	IC, (74HC74)		
Q 9	IC, (MSM6903AS)		
Q 10	IC, (XR-T5670CP)		
Q 11	IC, (74LS38)		
Q 12	Tr, (2SC2901)		
Q 13	Tr, (2SC2901)		
Q 14	Tr, (2SC2901)		
Q 15	Di, (1S953)		
Q 16	Di, (1S953)		
Q 17	IC, (uPC14305H)		
R 1	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R 2	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R 3	CF, (ARD25T224J)	220kΩ, ±5%, 1/4W	

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A9 (Option 03) DS-1 OUTPUT 19

CKT REF	DESCRIPTION	RATING		NOTE
R 4	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 5	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R 6	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 7	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R 8	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 9	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 10	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 11	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 12	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 13	CF,(ARD25T751J)	750Ω,±5%,1/4W		
R 14	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 15	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 16	CM,var,(RJ6P200Ω)	200Ω,1/2W		
R 17	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 18	CF,(ARD25T100J)	10Ω,±5%,1/4W		
R 19	CF,(ARD25T100J)	10Ω,±5%,1/4W		
R 20	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 21	CF,(ARD25T221J)	22pΩ,±5%,1/4W		
T 1	Trans,(439T23519)			
Z 1	XTAL OSC,(VCX0-105G)	3.088MHz		

( ): Manufacturer's part number

* : Selected at factory

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